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Dear Paul,

In accordance with the requirements of referenced contract, we are pleased to submit this SM21 CONOPS Revised – Phase II Joint Force Deployment and Distribution Support Platform: Joint Operational Concept for your review.

Your comments on this document are welcomed.

Regards,

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Strategic Mobility 21 Principal Investigator

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Strategic Mobility 21

SM21 CONOPS revised - Phase II Joint Force Deployment and Distribution Support Platform: Joint Operational Concept

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ABSTRACT

The Strategic Mobility 21 (SM21) Joint Deployment and Distribution Process Technology Demonstration program was mandated by Congress to research, develop, and demonstrate advanced multi-modal logistics technology. The program resulted in the development of an advanced logistics concept known as the Joint Deployment and Distribution Support Platform (JDDSP). The JDDSP combines the physical elements and capabilities of an Agile Port System (APS) with an information technology enabling architecture that includes business process reengineering and decision support prototype. The concept was initially developed to support dual-use, military and commercial, goods movement in Southern California utilizing a selected inland multi-modal freight hub, or Integrated Logistics Center (ILC), located at Southern California Logistics Airport (SCLA) in Victorville, California as the prototype platform. The JDDSP is designed to provide dual-use load consolidation, cross-dock transshipment support, a logistics buffer, and joint logistics education and training capabilities.

The APS concept adapted for the JDDSP is comprised of (1) an efficient marine terminal, which maximizes the use of on dock rail and advanced local dray distribution management; (2) a virtually integrated road and rail regional network capability, substituting for a dedicated physical transportation link; (3) synchronized operations with an inland multi-modal freight hub as a gateway load center for intermodal rail, container sorting by destination and distribution lane, consolidation and deconsolidation, cross-dock and trans-loading, and transportation equipment management (chassis, empty container, rail car, and trailer) interchange, storage, maintenance, and (4) an overarching regional information technology architecture to synchronize the vessel arrival and departure schedules with marine terminal, short haul rail network, and load center operations.

The military purpose of the JDDSP is to improve expeditionary warfare logistics support including joint force deployment, sustainment distribution, and retrograde/reset continuing processes. The JDDSP provides an agile distribution network exploiting advanced logistics concepts and capabilities to increase throughput velocity, static and dynamic in-transit visibility, and efficiencies in distribution network capacity utilization. The JDDSP is also designed to provide dynamic sourcing and routing capabilities and enhanced security/force protection from factory, depot, or installation through the last tactical mile-in theater to the ordering unit location.

The JDDSP is intended to address one of the principal lessons learned during Operation Iraqi Freedom (OIF), that no one command or entity owned or had visibility over the distribution of sustainment supplies from the factory, depot, or fort to the foxhole. In other words, there was no single Deparment of Defense (DoD) command or “fourth party logistics provider” (4PL) with the ability to direct and enforce in-transit visibility of cargo performance standards across organic, charter, and commercial lift platforms. The JDDSP would provide 4PL services including the ability to optimize sustainment distribution and the synchronization of joint force projection to and through the combatant commander's area of responsibility (AOR)[1].

[1] Also known as a theater

1.0 PURPOSE OF THE JOINT OPERATIONAL CONCEPT

The purpose of this Joint Operational Concept (JOC) is to present the formal Joint Deployment Distribution Support Platform (JDDSP) concept of operations being developed by the Strategic Mobility 21 (SM 21) Program[2]. is the JOC is the foundational document for the development of the JDDSP system, which is part of a Joint Deployment Distribution Enterprise (JDDE) community of interest and dual use[3] domestic distribution logistics support strategy. The JOC establishes the project vision and defines how the JDDSP will operate as an integrated node within the JDDE and the end-to-end joint force deployment and dual use logistics distribution systems.

The JDDSP is an operational level concept that merges adaptive planning, execution, and integration of both commercial freight operations and the deployment and sustainment of joint military forces within a single construct. The JDDSP, as a single node, will be able to seamlessly integrate with and support the end-to-end distribution process network. This JOC may also be viewed as the concept to capability development and deployment thread of the multi-year SM21 program from three levels: strategic, operational, and tactical.

On the strategic level, the JOC describes a generic inland multi-modal transfer facility in twin dimensions: (1) as a central node of the Integrated Logistics Center (ILC), or dual use regional agile supply network, operating under a common information technology architecture; and (2) as a prototype Joint Deployment Distribution Support Platform (JDDSP) operating in support of one or more Power Projection Platforms (PPP), including the National Training Center at Fort Irwin and other military installations. In this role the JOC presents the ability to achieve rapid deployment and focused logistics objectives capable of being replicated in other geographic regions of the continental Unites States (CONUS), in an Advance or Intermediate Staging Base (e.g. Guam or Diego Garcia), and in theater in a joint, coalition, or interagency theater environment with or without Host Nation Support. The JDDSP would support end-to-end joint force deployment and agile sustainment distribution through decision support tools, cargo and asset tracking, and business process reengineering.

In an operational sense, the inland facility provides the missing element of transparency as to current conditions of military and commercial movement operations and the regional impact of individual stakeholder decision-making. The JDDSP would utilize a common relevant logistics operating picture (LOGCROP) through a regional web portal. The portal would be supported by both wide area sensor networks in CONUS and in theater for autonomous data capture, and by a flexible, modular dashboard with decision support toolkits. The portal would provide the capability of monitoring, synchronizing, exercising command and control responsibilities, and dynamic recovery in the event of a major disruption between participating marine terminals and a short haul rail system - all operating under a common information technology architecture related to the regional military and commercial goods movement. Top-level military and commercial decision-makers would be provided with the tools to optimize the use of existing

[2] Strategic Mobility 21 is a Congressionally mandated and independently funded applied research program through the Office of Naval Research. The program is conducted under the auspices of the Center for the Commercial Deployment of Transportation Technologies (CCDOTT), a government-industry academic collaborative enterprise.
[3] The term dual use refers to the use of system by both the commercial and military sectors.

distribution system infrastructure capacity to maintain or exceed established throughput and inventory objectives.

In a tactical sense, the JOC and the SM21 program offer a proof of concept for an integrated series of related concepts all designed to achieve virtual integration of road and rail intermodal operations providing just-in-time and sequence synchronizing of the distribution flow process. The objective is to de-conflict military and commercial multi-modal transportation requirements, including reducing the logistics footprint and dwell time for cargo at strategic seaports. The JOC and the SM21 program are ultimately designed to improve joint force protection and required delivery date to theater.

The JDDSP is a single integrated node within a coherently joint deployment and sustainment concept. The JDDSP is designed to:

- Support the Department of Defense (DoD) Logistics Transformation Strategy for military force deployments and sustainment,
- Support the improvement of commercial freight operations while reducing truck traffic congestion within and through the Southern California Region and other global gateways,
- Enable the increased use of the Southern California Strategic Ports for Joint Force Deployment by reducing the logistics footprint and dwell time that force deployments have on commercial terminals,
- Supplement and support Fort Lewis as the only Power Projection Platform on the West Coast (See Figure 1 for an overview of the current Power Projection Platforms and supporting Strategic Ports),
- Provide an air cargo expediting center and alternate West Coast Aerial Port of Embarkation (APOE),
- Provide a second JDDSP at Fort Gillem, GA, redeveloped starting in 2011 under the DoD Base Realignment and Closing (BRAC) serving the strategic ports of Savannah, Jacksonville, and Charleston. Although not a strategic port, the port of Brunswick would also be supported by the JDDSP
- Enhance the National Military Strategy of being capable of supporting one major contingency operation (MCO) while supporting multiple actions associated with the Global War on Terrorism (GWOT), and
- Serve as a prototype JDDSP that can be replicated in other geographic regions and in Joint Sea Basing Logistics.

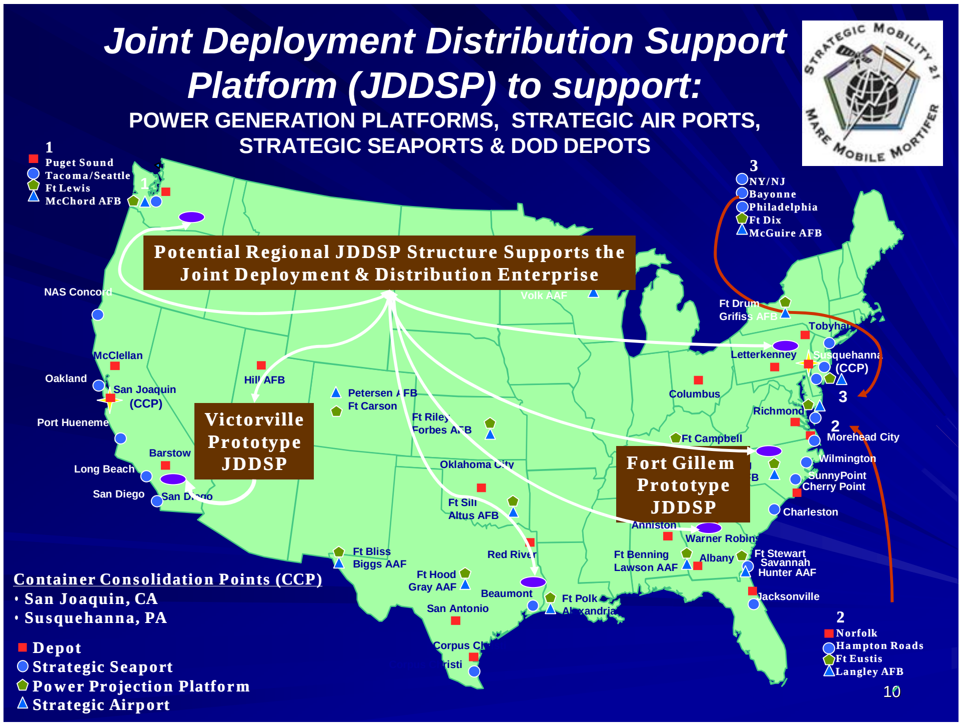

Figure 1: Joint Deployment Distribution Support Platform Structure

2.0 SCOPE OF THE STRATEGIC MOBILITY 21 PROGRAM

The SM 21 is focused on the development of a prototype JDDSP - a component of an Agile Port System (APS) and a suite of related capabilities. The current SM 21 APS model includes a dual use efficient marine terminal (EMT) and regional multi-modal transfer facility or hub with a supporting integrated logistics network. The prototype JDDSP will extend and enhance the functions of the current hub design for implementation within the future Southern California APS. The prototype JDDSP will be developed by combining the essential elements of the approved DoD Logistics Transformation Strategy[4] for achieving knowledge-enabled logistics with commercial distribution best practice capabilities.

The initial prototype JDDSP could be developed on the site of the former George Air Force Base in Victorville, California ("Victorville")[5] as an integral component of the Southern California Logistics Airport. The Victorville prototype would be the command and control (C^2) hub and key physical component of a planned dual use Southern California APS system. It is anticipated that dual use multi-modal freight hubs will be developed across the nation in each geographic region over the next decade as a result of public-private partnerships and efforts such as the development of the JDDSP prototype. It is further anticipated that the regional freight hubs

[4] The DoD Logistics Transformation Strategy was developed to comply with the FY06 Defense Strategic Planning Guidance.

[5] In this document, Prototype JDDSP and Victorville are used interchangeably to describe the same prototype concept of a multi-modal, inland port. In the initial Concept Document, the JDDSP was referred to as a Power Projection Support Platform or PPSP. As the concept has matured, the title has changed to Joint Deployment and Distribution Support Platform (JDDSP), to better express the vision captured in the JDDSP concept. Hence, the concept will be referred to in this document as JDDSP, not PPSP.

functioning as JDDSP's will be integrated for DoD force deployment and sustainment by a national C^2 hub located at one of the JDDSP sites, The integrated system would include multiple PPP's and Strategic Ports[6] linked by the strategic rail network (STRACNET).

The second potential location for a prototype JDDSP is Fort Gillem, GA adjacent to Hartsfield—Jackson International Airport with potential direct rail service via Norfolk Southern railroad with the ports of Savannah. The JDDSP at Fort Gillem would support the 3d Infantry Division deployments from Fort Stewart and the 101st Airborne Division deployments from Fort Campbell, Kentucky to the ports of Jacksonville. The JDDSP would also serve the Marine Corps Logistics Base - Albany, Georgia.

Strategic Mobility 21 leverages commercial investments and innovation in adaptive-distributed supply networks, automated warehousing and distribution facilities, automated tracking capabilities, and collaborative Web 3.0.semantically enabled information architectures built to DoD Defense Information Systems Agency (DISA) standards of interoperability and multi-level information assurance. In addition to leveraging existing air passenger and cargo facilities and the supporting surface transportation network at Victorville, SM 21 will integrate commercial and militarily useful infrastructure including:

- A rail rapid deployment facility,
- Connecting regional and rail high speed network (STRACNET),
- Buffer sustainment stock management facility to support the DoD Sea Basing and Sense and Respond Logistics concepts,
- A trans-loading facility with seamless track and trace capability for air and surface cargo, and
- A commercial fulfillment center for vendor-managed inventory and Business-to-Business (B to B) and Business to Customer (B to C) transactions.

Victorville will primarily function as an integrated transportation equipment and freight logistics buffer, and it will provide information management systems to support the buffering concept and global tracking of US Marine Corps and Army unit equipment and sustainment (re-supply) shipments.

Fort Gillem will serve as a High Cube (overloaded containers) High Throughput Velocity (7/24/365 operations), High Value (electronics, pharmaceuticals, nutraceutical, fresh fruits and vegetables, wine and spirits in bond and Foreign Trade Zone), High Inventory Turnover (12 times per year minimum), intermodal and integrated warehouse and distribution facility.

Both facilities will provide a backbone (including the nation's first joint Federal-State agriculture inspection facility) for moving unit trains of initially fruits and vegetables as a surrogate for unit capability packages coast to coast within four days (combat or administrative load) with unit equipment to major Southern California training areas (National Training Center Fort Irwin and

[6] Seaport of Embarkation (SPOE) and Strategic Port are used interchangeably in this document. A SPOE is a geographic point in a routing scheme from which cargo or personnel depart by sea transport en-route to a seaport of debarkation or arrival.

29 Palms Marine Air Ground Training Facility) while maintaining unit integrity with improved force protection.

In addition to being a standard template or prototype JDDSP, both the Victorville and Fort Gillem facilities will function as innovation cell as part of the Joint Logistics Experimentation Training Transformation Test-bed (JLETT), the joint logistics associate stakeholder in the USJFCOM J7 Joint National Training Capability (JNTC), as a persistent site for advanced military and commercial logistics experimentation in such technologies as radio-frequency identification and other autonomous sensors, sense and respond logistics development, demonstration, deployment, and immersive logistics training. Victorville and Fort Gillem will both serve as DoD support platforms for network-enabled logistics transformation experimentation and provide support for other DoD Joint Capabilities Technology Demonstrations (JCTD) programs to successfully transition demonstration capabilities.

2.1 Problem Definition: Current Commercial and Military Context

Military and commercial global logistics are simultaneously undergoing fundamental transformation. Adaptive and distributed logistics are the cornerstones of logistics transformation. Rapid distribution and the visibility of inventory in storage, in process, and in-transit are the key enablers for successful commercial and military operations. The era of mass logistics and large inventories in both the commercial and military setting are an expensive artifact of the twentieth century. American manufacturing capacity dominated the world in the twentieth century and the cold war focused the military's deployment requirements.

Today lean logistics and the requirement for rapid worldwide military deployments caused by the rise of asymmetric warfare and the Global War on Terrorism (GWOT), now often referred to as the Long War, dictate greater efficiencies in agile force deployments and distribution networks. Business process re-engineering changes in both the commercial and military domains now place a premium on focused logistics: rapid deployment and distribution, agile sustainment and information fusion, reuse, and dissemination.

For the military, focused logistics is the ability to deliver the right personnel, equipment and supplies at the right place – in the right sequence - at the right time - in the right quantities. Similarly, in a global integrated economy a premium is placed on customer demand driven lean supply chains from origin to destination, with just–in-time movement, and time definite on demand delivery to the end user as part of an agile supply network- adaptive to changing competitive battlespace conditions and commander's intent with an emerging need for adaptive planning and execution, and dynamic re-planning in support of joint distributed operations.

As a common goal, both military and commercial planners seek to increase supply network velocity measured in transit times, as well as inventory turnover from origin to destination, including dwell times at static nodes and speed over arcs within the network. In the case of commercial imports a 21-day standard transit time is used from an Asian point of origin to a destination at point of delivery to the ultimate consignee.

Within that framework, typically twelve days are absorbed in the ocean line haul leg and five days for domestic inland movement by rail or over the road truck. This absorption leaves four to five days for Customs clearance and marine terminal handling including demurrage or free time, which is used to sequence cargo movement through trans-load or regional warehouse facilities. The lack of electronic data interchange between marine terminals, local drays, and warehouse and distribution facilities, results in in-transit visibility gaps resulting in congestion and friction within the regional distribution network. Delays in the end-to-end system are normally the result of poor coordination between modes, and the aggregate impact of many shippers leaving freight on the dock for several days or weeks. System gridlock occurs when the delayed clearance of cargo from a terminal, in combination with terminal gate movement, peaks during daylight hours. This gridlock is now somewhat mitigated by greater use of night gates for truck movements.

Until recently, both military planners and distribution management systems focused distribution network planning on a segment-by-segment basis and not as an integrated, end-to-end network centric environment. The result has been a predictable breakdown in the end-to-end deployment and distribution process visibility, loss of operational and tactical flexibility, and, in the case of critical components and supplies, mission degradation.

Current Commercial Problem

There is a sea change in Federal and State transportation policy focused upon promoting freight mobility by encouraging modal shift from long haul truck over the Strategic Highway Network (STRAHNET) to long haul unit train rail over the Strategic Rail Network (STRACNET) linking major transportation nodes and Sea and Air ports of Embarkation. This major policy shift is directed toward reducing energy consumption and carbon footprint per ton of freight, and mitigating regional air quality and congestion by displacing truck trips and incentivizing greater use of on dock rail at major seaports. By providing an inland logistics node to “pull” freight from marine terminals and increase velocity, network visibility, and efficiency all at the same time, the JDDSP concept enables this policy shift to benefit both military and commercial freight sharing the same surface transportation network.

In addition, there is a global freight movement phenomenon that will fundamentally alter domestic distribution patterns in CONUS for decades to come. In 2014 the Panama Canal will unveil a deeper wider sea route from Asia to Eastern North America and Europe. For years ship sizes transiting the waterway were limited by the depth and width of the seaway. No longer, there is now the marine equivalent of a land rush to deepen channels and berths to accommodate the largest class of container vessels now entering commercial service.

The net effect upon Joint Force deployment is to equalize over time the distribution of freight destined for East Coast and Midwest destinations and to encourage greater use by shippers of South Atlantic and Gulf Coast ports, placing greater emphasis upon marine terminal efficiency and interoperability between modes presaged by the surge in West Coast bound Asian cargoes in the 1990’s. Rapid joint force surge mobility is the ultimate winner as those same forces and freight movement trends can be leveraged to the advantage of using high speed rail and unit trains to move DoD units with their equipment from one coast to another for joint training and

deployment purposes. The Strategic ports served by the two initial JDDSP prototypes including Los Angeles, Long Beach, San Diego, Charleston, Savannah-Brunswick, and Jacksonville will no doubt experience these global forces and can be assisted to respond in ways that leverage those forces and promote DoD objectives of rapid deployment, agile sustainment, and information fusion at the same time.

The SM 21 program can also directly impact and affect the course and speed of those developments. For example, in the Port of Jacksonville, through the conduct of independent surveys and analyses, cases that support local rail safety, port access, and force protection improvements can be articulated that will directly impact deployments by the USMC from Albany, GA and the 101st Airborne from Fort Campbell, Kentucky.

Likewise, those adverse conditions reflected in inefficient business practices that adversely affected the ability of Southern California ports to adequately respond to a surge in import cargo on the 1990's are likely to repeat themselves in the Southeast and can be mitigated by early planning and adoption of the JDDSP concept.

In the aggregate these conditions manifest themselves in the virtual absence of any degree of coordination or supply network collaboration extending beyond individual competing supply chains or networks. There is little coordination of regional and national transportation system infrastructure capacity utilization, creating inevitable competing demands for network capacity. There is an absence of command and control structures, or market incentives or disincentives for allocating, prioritizing, or even optimizing use of network capacity or capacity expansion.

However, there is now increasing public recognition of the external costs of inefficient capacity utilization, which causes regional congestion, pollution, safety, and more recently homeland security risks. Simply put: **There is a recognized immediate need for regional collaborative structures to meet current and future global trade driven demand and to support unpredictable military requirements without significantly impacting commercial commerce.**

Despite growing momentum to redistribute freight across multiple gateways as a risk mitigation strategy, by any measure Southern California remains the national freight gateway for the 21st Century affecting every part of the country as the hub of an intermodal freight distribution network. The Southern California region, home to 22 million in population, is the nation's largest metropolitan area. This means that roughly one-half of all imported goods are distributed within the region in contrast to other gateways.

Nowhere else in the United States is this lack of regional collaborative network coordination more marked and self-evident than in the periodic major supply chain disruptions to west coast ports such as occurred in the ports of Los Angeles-Long Beach in the summer and fall of 2004. By virtue of their dominant market share (70% of west coast and 45% of national imports), the ripple effects of periodic disruptions in the Ports of Los Angeles-Long Beach are felt throughout the supported supply chains and in the national economy.

The already stressed regional logistics network was simply unprepared to cope with the arrival of mega ships designed to load and unload 7-10,000 Twenty-foot Equivalent Units (TEU) within 72 hours on a 7/24 three labor shift basis. This coincided with major planned attrition of Union Pacific rail crew personnel, rail car equipment availability problems traceable back to the UP-SP rail system merger, a chronic shortage of truck drivers exacerbated by recent hours of service regulatory limitations (unpublicized but affecting rail crews as well), and lift capacity limitations at major intermodal rail ramps at Hobart, East Los Angeles, and San Bernardino. Southern California's experience is a wakeup call for the rest of the nation's ports and regions.

The impacts of these disruptions are felt throughout the supply chain - in the national economy, and in delay driven increased transportation and distribution costs to consumers. At the individual company level, the impact is reflected in lost sales, increased transportation costs, inventory and holding costs, safety stocks, and the costs of cargo diversion, alternate sourcing, and equipment repositioning. Supply chain unreliability wreaks havoc with planning, scheduling, purchasing, sales, and distribution. Suppliers are affected by charge-backs for failure to maintain delivery dates for merchandise.

A Southern California Agile Supply Network (SCASN) supply chain simulation model developed by the Strategic Mobility 21 research team has validated current infrastructure capacity and operating conditions adversely affecting the movement and rapid deployment of commercial and military goods through Southern California including:

(1) Peak vessel arrival and departure scheduling at fifteen marine terminals that result in inefficient use of marine terminal capacity;

(2) Asymmetric marine terminal operating practices with three shift 7/24 marine operations and 8-5 single shift gate hours that compresses terminal truck traffic. The result is long truck wait queues, terminal and road congestion on major arteries in and out of the POLA POLB port complex, and bottlenecks and delays in container handling. This situation indicates the need for the introduction of transportation system demand measures to maximize the use of existing capacity (Introduction of PierPass incentivized night gates displaced significant truck traffic to off peak hours, but the national recession has had a greater proportionate impact in alleviating congestion than changes in business practices);

(3) Sub-optimized use of regional supply chain capacity at marine terminals, the Alameda Corridor, intermodal rail transfer facilities, and inland warehouse and distribution and military training and deployment installations;

(4) Growing capacity constraints in the rail main line, intermodal rail transfer, and grade separations east of downtown Los Angeles requiring introduction of measures to maximize use of existing rail capacity;

(5) Capacity and security related delays in vessel, gate, intermodal transfer, and warehouse and distribution center queues;

(6) Emergence of regional air quality restrictions, and public health and safety requirements, affecting vessel scheduling, truck wait queues, and use of existing marine terminal capacity and precluding future capacity expansion;

(7) Financial limitations on future regional supply chain infrastructure capacity expansion;

(8) Migration of new warehouse and distribution centers to the Inland Empire increasing cycle times for trucks at marine terminals; and

(9) Emergence and rapid growth of trans-loading and third party logistics facilities increasing the number, destination, and frequency of inland dray and trailer movements between the ports and warehouse and distribution facilities.

All these trends and conditions describe a complex, highly stressed regional supply chain of critical national significance given the fact that the region is the gateway for 45% of the nation's import containers (and 70% of west coast imports). Nevertheless its strategic position and transportation infrastructure dictate its important role as both an alternate route for military deployment and given the proximity of current and former military bases, a natural proving ground and test bed for new rapid deployment strategies and tactics.

Current Military Problem

DoD is no stranger to supply chain disruption and logistics network challenges. Despite quantum improvements in throughput velocity and efficiency over logistics efforts a decade earlier in support of Operation Desert Storm, Operation Enduring Freedom in Afghanistan and Operation Iraqi Freedom after action reports and lessons learned indicate many deficiencies still exist. In short, there is still a significant gap yet required to be closed to implement focused logistics practices.

While the commercial sector has been concentrating on end-to-end distribution process visibility (origin to destination represented by the ultimate consignee), both military planners and systems have, until recently, limited distribution network planning to port-to-port and not end-to-end planning. The responsibility for intra-theater distribution has been traditionally the combatant commander's responsibility. The Theater Movement Control Agency, without the benefit of integrated information-centric logistics support, independently managed the most critical elements of the deployment and distribution process: reception, staging, onward movement and integration of military forces and sustainment distribution. The impact has been the predictable breakdown in end-to-end deployment and distribution process visibility resulting in cargo shrinkage, redundant ordering of supplies, loss of operational and tactical flexibility, and in the case of critical components, mission degradation.

The pending return of as many as 70,000 additional military forces to the United States, and the associated unprecedented retrograde and reset of unit and pool equipment will similarly exacerbate an already troubling force deployment and sustainment situation. The final report of

the Commission on Review of Overseas Military Facility Structure of the United States, completed in May 2005 concluded: "The Commission is concerned, however, that adequate strategic sealift, airlift, and pre-positioned equipment and stocks do not exist and that current intra-theater airlift is over-stressed. Aside from the lift capability, the Commission is also concerned that the air and sea ports, inter-nodal connectivities and other mobility enabling systems are not adequate to meet potential contingencies." Moreover, the Commission noted that the budgetary plans for mobility assets are inadequate to meet projected lift demand.

In a twenty-first century geopolitical focus on the Pacific Rim and Southwest Asia, DoD cannot rely upon a single west coast Power Projection Platform located at Fort Lewis, Washington, and a single capacity constrained strategic port. The Department of Defense has a vital stake as an invested stakeholder in the outcome of resolving freight bottlenecks and wringing full capacity utilization from the Southern California freight transportation infrastructure and improving transportation equipment management to meet burgeoning trade related demand. DoD has a stake in this effort not only as our largest domestic shipper, but also in the need for preserving power projection capability on the West Coast to the Pacific Rim.

In addition, most pre-deployment roads lead through one or the other of the DoD's large scale unit training facilities located in the Southern California region: Fort Irwin National Training Center and 29 Palms Marine Air Ground Training Facility for US Army and Marine Corps units respectively. Currently units are constrained by the existing transportation infrastructure at the Fort Irwin National Training Center from deploying their full complement of combat vehicles so they can "train as they will fight." Instead units train on pre-positioned equipment. The result is training on combat systems that can be significantly different from what they must operate in a combat situation. Currently all force deployments from Fort Irwin must travel by an extended convoy route to the Yermo rail yard located on the Marine Corps Logistics Base near Barstow, California. At the Yermo facility unit equipment is loaded on railcars for subsequent deployment through the Port of Beaumont, Texas. The Southern California port congestion problems, supporting rail infrastructure, and lack of an integrated transportation network have created this undesirable situation.

A review of after action reports and lessons learned in Operation Iraqi Freedom reveal a number of critical capability gaps inherent in the "As Is" Deployment and Distribution Process.

These capability gaps include:

- Hierarchical, stove-piped logistics chains –and legacy systems- which together cannot support distributed, adaptive operations

- Phased deployment of homogeneous units via fixed infrastructure and traditional sustainment mechanisms are not responsive enough for Network Centric Warfare

- Existing logistics information architecture focuses on port-to-port not end-to-end distribution process, and for retrograde and reset is largely non-existent

- No single platform to track in-transit visibility at ground level and for input to higher level enterprise architecture for decision support

- No dynamic network visibility to locate and determine status of assets across network

- DoD Automated Identification technology (AIT) use is sub-optimized through inadequate business processes and inadequate individual and unit training

- Current marshaling and staging procedures at US Strategic Ports add disruptions to commercial operations and prolong delivery time to theater and require unsustainable logistics footprint and dwell time at marine terminals shared with commercial cargo

- Limited synchronization of vessel load planning across modes and stowing at strategic ports, inter theater movement, and “arrival to flow” through Reception, Staging, and Onward Movement at Sea Ports of Debarkation (SPOD)

- Limited use of combining asset identification technology with information flow monitoring transportation equipment movement

- No wide area network information architecture template that can be rapidly deployed to extend asset and shipment visibility and C2 intra-theater via Sea Basing or Intermediate Staging Base

- No logistics buffer to function as fulfillment center to maximize throughput at a Sea Base or other distributed logistic network

- Supply chain vulnerability degrades force protection

The Maritime Administration (MARAD), within the Department of Transportation (USDOT), issues port planning orders (PPO) to each US port designated as a strategic port by the DoD and MARAD. As a strategic port, selected marine terminals within the port complex are responsible for supporting military deployment, redeployment, sustainment distribution, or retrograde operations. The latter now threaten to overwhelm expanding commercial operations at ports such as Jacksonville and Charleston. Truth be known, given current and future forecasted commercial freight import flows, most ports are operating at or near capacity and would prefer not to have DoD business, patriotic motivations notwithstanding. As noted above, historically military operations consume valuable marine terminal space for considerable periods of time. The current process of marshalling and staging all unit equipment first at a DoD installation and redundantly again at a marine terminal before starting ship loading operations is the primary cause for the disruptions.

2.2 Future Context of Deployment and Distribution Process

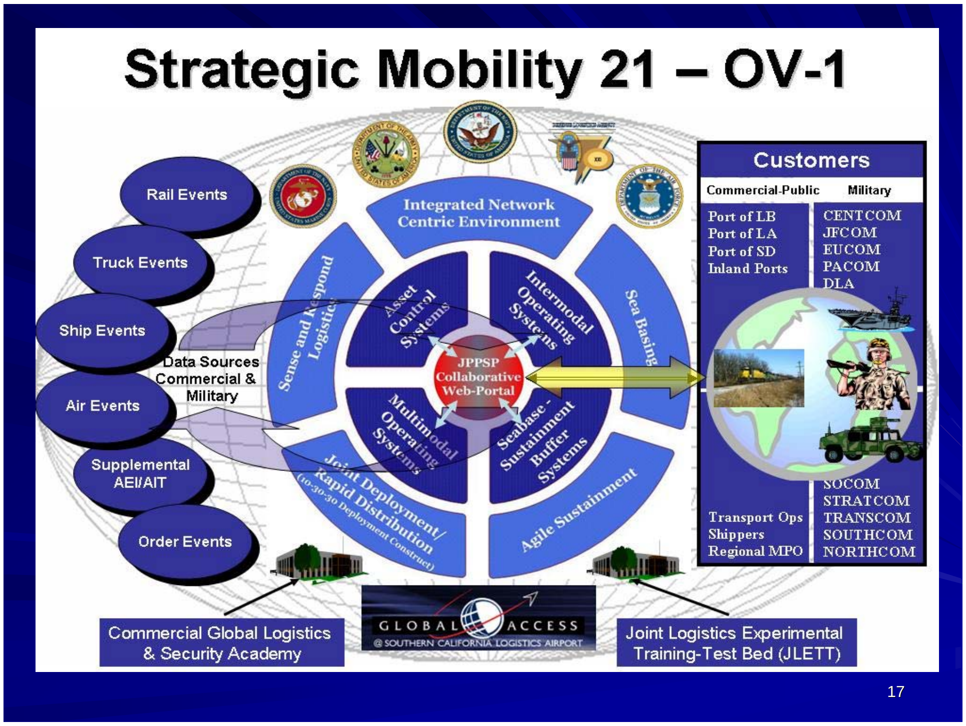

Figure 2: Joint Deployment Distribution Support Platform Functional View

For purposes of this Joint Operations Concept (JOC), the anticipated draw down of forward deployed forces over the next decade and declining availability of overseas bases dictate:

(1) An ongoing approach to evaluating strategic mobility requirements and capabilities in support of the Long War of expeditionary character;

(2) The emergence of a largely CONUS based heterogeneous force from which to draw mission specific modular combat and support units (mission specific unit capability packages built upon brigade combat teams) for a given contingency;

(3) The need for a domestic network of integrated power projection facilities and supporting JDDSP capability for surge deployment purposes;

(4) Increasing dependence upon the domestic marine transportation system and commercial distribution networks;

(5) Growing interdependence among military and commercial supply networks and a concomitant need for interoperability of supply systems and distribution networks as well as utilization and practical application of advanced logistics concepts; and

(6) The continued attrition of regular forces after a single tour of duty and increasing dependence upon National Guard and Reserve for the performance of transport and logistics functions generate a paramount need for a fundamental review of core military and commercial functions.

Because of this situation, there is a need for actual and virtual immersive training in pre-deployment and distribution network operations, and requisite logistics skills development and maintenance in both the commercial and military logistics domains.

2.3 Future Joint Expeditionary Warfare and Sea Basing Context

Strategic Mobility in the Navy and US Marine Corps operational context is embodied in the concept of Expeditionary Warfare. The transformational focused logistics objective for Expeditionary Warfare is the transition from conventional amphibious warfare to a distributed logistics networked environment and set of functional capabilities collectively referred to as Joint Sea Basing in support of Joint Distributed Operations across the battlespace. Over time the US Army will become more expeditionary and necessarily collaborate with the Marine Corps, both as part of rapid deployment, as well as sustainment and redeployment operating capabilities.

One of the enduring expeditionary warfare lessons learned in Operation Iraqi Freedom (OIF) is the need for reduced dependence upon foreign basing and access rights (For example the convoluted nature of port operations in Ashwaba, Kuwait following conclusion of Major Combat Operations phase of hostilities). From this manifest need, the future operational focused logistics enabled concept of Sea Basing has emerged. If the Sea Basing concept is not continued, then a more integrated form of Naval Logistics Integration in support of traditional amphibious operations should be initiated.

Sea Basing describes an inherently maneuverable, scalable aggregation of distributed, networked platforms that enable the global power projection of offensive and defensive forces from the sea. The concept includes the ability to assemble, equip, project, support, and sustain those forces without reliance on land bases within the Joint Operations Area. Sea Base capabilities allow joint forces to exploit the maneuver space provided by control of the sea. Sea Base capabilities will minimize limitations imposed by reliance on overseas shore-based support; maximize the ability of the joint force to conduct sustained, persistent combat operations from the maritime domain; and enable the transformed joint force to exploit our Nation's asymmetric advantage in the battle space.

Strategic Mobility 21 will conduct simulations and experiments related to supporting Joint Sea Based Operations through the management of sustainment buffer stocks maintained at the Victorville and Fort Gillem JDDSP's as a surrogate Advanced Base or Intermediate Staging Base rather than the Sea Base itself. As a part of the joint experimentation campaign, a modified vendor-managed inventory concept will be developed and tested. The ability to emulate agile commercial distribution systems by balancing inventory demand fulfillment between multiple JDDPS using high speed rail and air will be a central part of this effort as well as a template for intra-theater distribution in a Sense and Respond logistics environment with a C2 reach back capability to CONUS.

2.4 Timeframe, Operational Context. Assumptions, and Risks

The Strategic Mobility 21 program is structured as a multi-year; multi-dimensional functional equivalent of Joint Capabilities Technology Demonstration (JCTD) in advanced logistics concepts focused on the development of one or more prototype JDDSPs. The program will adapt a development strategy similar to the DoD logistics transformation strategy. Development of the JDDSP will be a continuous process over a multi-year program period using a transformational co-evolution process. What this means in simple terms is that the JDDSP will evolve over a multi-year period from concept to operational system. This evolutionary process will be in concert with DoD logistics transformation initiatives and commercial best practices. The program will incorporate discovery learning-oriented, hypothesis-driven experiments, including simulations, technical assessments, emulation, and military use evaluation. Interactive experiments with military units and commercial companies will be conducted to complete early operational testing of Initial Operating Capability (IOC) beta versions of software systems and hardware.

The following assumptions frame the Strategic Mobility 21 JOC and provide the context under which this JOC applies:

- Consistent with the Long War thesis, there will be a persistent international terrorism threat that will be increasingly diverse, and the location for required force projection will be difficult to predict.

- When appropriate, the US will act with other nations to provide a coalition multi-national approach to defeating shared threats. However, the US will maintain a unilateral expeditionary warfare capability to act militarily to protect vital national interests, which reduces the amount of time available for joint force deployment preparation and execution.

- Cargo importation trends eventually shifting from west to southeast and gulf coasts will continue to place pressure on the surface transportation infrastructure in the United States making port clearance difficult and reducing the ability of Strategic Ports with established port planning orders (PPO) to meet force deployment requirements.

- The Southern California Logistics Airport (SCLA) and For Gillem Local Reuse Authority strategic development plans will be able to support multi-modal and intermodal regional and national dual use functional requirements.

- The DoD Joint Functional Commanders (US Transportation Command and Joint Forces Command) and expeditionary warfare service components (USMC, USA, NECC/NOLSC) will support the development of a prototype JDDSP.

3.0 STRATEGIC MOBILITY 21: CENTRAL AND SUPPORTING REQUIREMENTS AND OPERATIONAL CONCEPTS

3.1 The Central Concept – Focused Logistics

The organizing principle for the Strategic Mobility 21 program is the DoD Joint Logistics Functional Concept developed to achieve logistics capabilities in support of joint distributed adaptive operations. As such, Focused Logistics is the strategic concept that defines broad joint logistics capabilities that are necessary to deploy, employ, sustain, reset, and re-deploy forces across the full spectrum of military operations. The Focused Logistics Concept will be used to guide the Victorville and Fort Gillem JDDSP development to ensure the supporting infrastructure, business processes, and information systems fully support Joint Force Projection and Sustainment for Full Spectrum Operations (JFP&S).

The Focused Logistics Concept is based on six tenets that will be the framework for designing a JDDSP logistics template. The development of the JDDSP will focus on three of the six tenets as follows: Joint Deployment/Rapid Distribution; Information Fusion; and Agile Infrastructure. The remaining three tenets - Joint Theater Logistics C^2, Multinational Logistics, and Joint Health Services Support - will be referred to for compliance.

The SM 21 program has developed an operational enabling concept that is a paradigm for a national transportation network-centric driven transformational change that fully supports the Focused Logistics tenets. The concept development to deployment process began of necessity in Southern California where logistics and distribution is emerging as the primary engine of economic growth, displacing entertainment and light manufacturing. It will migrate to incorporate the emergence of additional prototype multi-modal facilities linked by a high-speed freight rail network within CONUS, such a Fort Gillem. The program will develop the portable information backbone and template for intra-theater support of expeditionary warfare operations under the emerging set of focused logistics functional capabilities overviewed above. To develop this template, the Strategic Mobility 21 program will include a series of progressive joint experiments and field demonstrations wherever possible and support designed to develop a prototype JDDSP integrated with components of the APS.

The SM 21 program emphasizes the use of the commercial components of the APS by combining:

(1) An efficient marine terminal (defined as one maximizing the use of on-dock rail capacity and best operating practices in military and commercial cargo handling with minimal mutual interference),

(2) Inland multi-modal freight hub and Integrated Logistics Center (ILC) functioning as a prototype JDDSP facility,

(3) Dedicated or integrated surface transportation link (virtually integrated rail and truck network), and

(4) Information technology network architecture including Electronic Data Interchange (EDI) standard message data, Automatic Equipment Identification (AEI), Radio Frequency Identification (RFID) and data fusion from embedded cargo and asset sensors. The architecture will include the adoption of information-centric capabilities such as intelligent agents and sense and respond logistics, and semantic web and cloud computing enabling an interoperable, composable, reusable, and secure knowledge management repository.

3.2 The Joint Deployment Distribution Support Platform (JDDSP) Concept

The JDDSP concept includes an agile distribution system supported by a network-centric information technology backbone. The information network will be designed to integrate the distribution nodes including: marine terminals, intermodal rail ramps, multi-modal facilities, aggregated warehouse and distribution centers clustered into freight villages or integrated logistics centers, and distribution lanes or arcs connecting the nodes to form a regional and national network.

The prototype JDDSP will become the intra and inter-regional transportation information network hub. This same prototype design can be replicated in the Sea Basing context as the advance or intermediate staging base link back to CONUS for inter and intra-theater distributed logistics networks. In the military context the nodes are represented by installations, depots, and Power Generation and Support Platforms, Strategic Sea and Airports of Embarkation and Debarkation, advance or intermediate staging bases (ISB), expeditionary task group or prepositioned vessels/platforms functioning as virtual warehouses, the distribution lanes represented by helicopters or vertical takeoff fixed wing aircraft, and high speed surface craft functioning as system connectors.

The JDDSP design will be guided by high-level commercial business processes and operating techniques and the tenets of the DoD Focused Logistics Concept. A template will be developed that will target and align the facility development strategy to respond to the emerging needs of commercial and military shippers considering:

- The ongoing requirement for supply network in transit visibility, reliability, and agility by providing continuous autonomic visibility and logistics buffer/fulfillment space at the JDDSP affording additional time flexibility to the supply network currently satisfied through the use of free time or demurrage at marine terminals[7] and additional inventory in the pipeline at additional cost to the shipper;

- Ocean, rail, and truck carriers gradual shift to asset and non-asset based third party logistics providers in terms of equipment management and interchange and just–in-time provision of chassis, grey box empty containers, trailers, and rail cars;

[7] Free time is destined to disappear as a victim of marine terminal requirements to turn over containers and reuse valuable terminal space overwhelmed by so called mega ships of 8,000 TEU or more. Substitute free time opens the door to vendor managed inventory at the Victorville facility on a large scale affording shippers even more predictability, reliability, and flexibility in import operations planning.

- Potential DoD outsourcing of portions of the deployment and distribution process to fourth party logistics providers such as envisioned as the transition vehicle for the JDDSP operator ion combination with joint logistics education, training, and continual technology development and evolution;

- Support for the deployment and distribution process from Power Projection Platforms via rail unit train to the JDDSP; and

- Joint Deployment Logistics Training requirements.

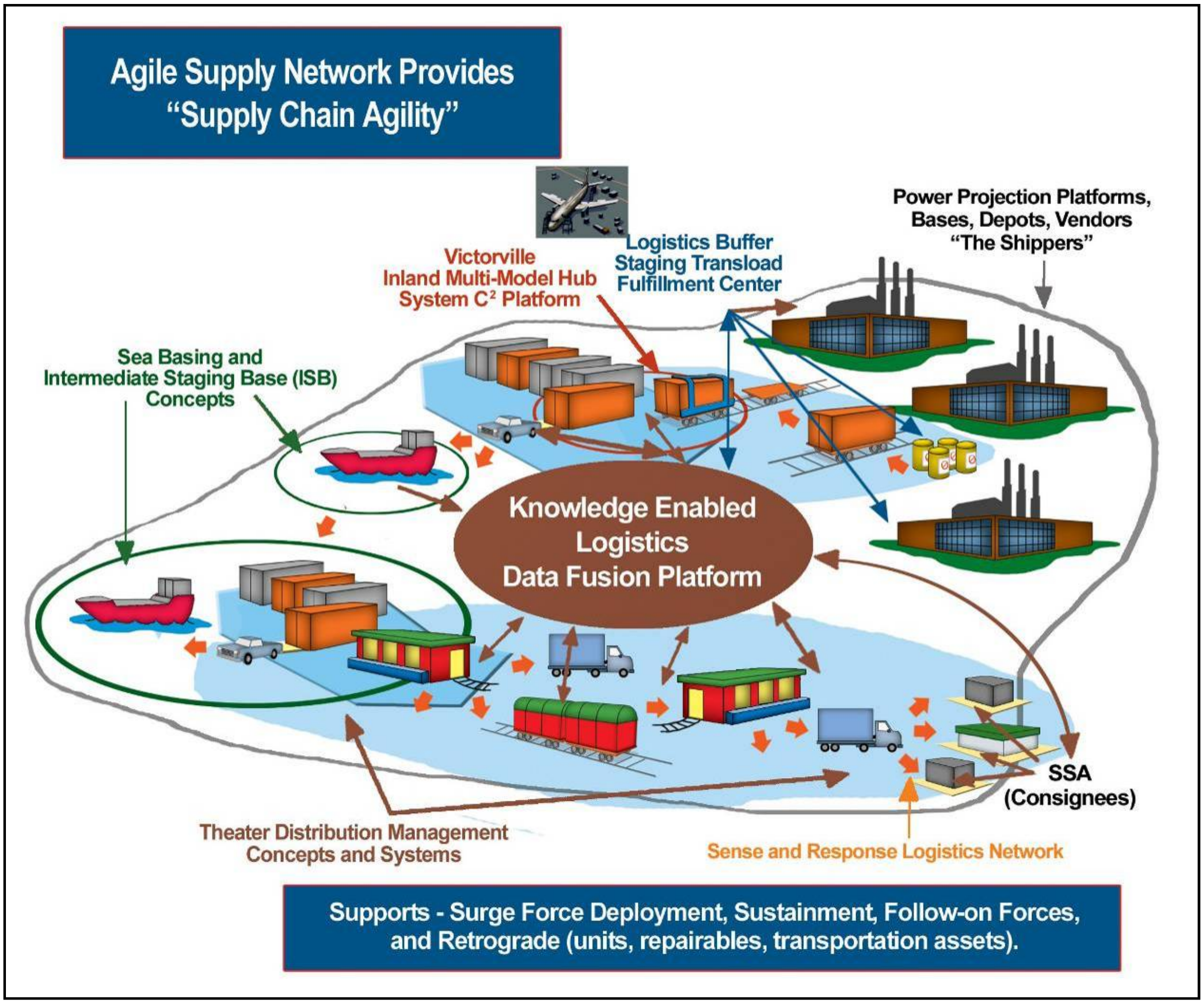

Figure 3: Joint Deployment Distribution Support Platform Operational View

The Victorville and Fort Gillem prototype JDDSP's will each be a multi-modal and intermodal facility connecting multiple inbound and outbound regional distribution lanes and functioning as a logistics buffer and fulfillment center. Each will incorporate optimized infrastructure design

layout and regional information technology architecture and communications framework accessible by a global web based portal.

As depicted in Figure 3, the Victorville JDDSP also includes a logistics buffer, staging, trans-load, and fulfillment center facilities. Its functional design is intended to:

- Relieve systemic pressure on marine terminals optimizing the use of increasingly scarce and expensive space for storage of on demand transportation equipment and increasing the utilization rate of high value rail yards and intermodal facilities,

- Relieve growth pressure on lift constrained intermodal rail ramps making up container unit trains to feed transcontinental main lines,

- Encourage modal shift for local drays to short haul rail affording much needed relief of overcrowded freeways and regional congestion, carbon footprint, and air quality mitigation,

- Restore regional agile supply network reliability and sustainability to military and commercial shippers alike, even raising expectations and minimizing mutual interference by providing individual shippers a short term supply chain buffer and the potential large scale vendor managed inventory and cross-docking and trans-loading opportunities, and

- Provide additional regional freight mobility, in transit viability, cargo security, and military force protection in support of joint force deployment, retrograde and agile distribution.

3.3 Joint Functional Concepts Supported by the JDDSP

Joint functional concepts supported by the JDDSP include the following:

- Collaborative data and information sharing in a secure environment, pre-deployment logistics planning for vessel and embarkation port selection, load planning, and synchronized movement flow of unit of action deployment modules and related equipment from multiple Power Generation and Support Platforms through Strategic Sea and Airports of Embarkation.

- Scheduled intermodal and manifest unit train rail movements of modular units by the most direct rail movement to minimize transit time, and synchronize arrival at the JDDSP in preparation for onward movement to the strategic port of embarkation.

- Use of agile infrastructure—the development of a more responsive infrastructure and improved command and control (C2) processes and systems to enable agile autonomic response to the logistics needs of the deployed joint force and just-in-time sequencing and synchronizing of personnel and unit equipment to Sea and Airports of Embarkation.

- The agile infrastructure will include rail facilities for pre-marshaling and staging of equipment flow by short haul rail to the strategic port to minimize footprint and dwell time at marine terminals and the disruption of concurrent commercial operations at significantly reduced unit transportation cost and opportunity cost that could be spent in pre-deployment training and personnel welfare, and reduced time to theater and Joint Reception, Staging, Onward Movement, and Integration (JRSOI) in theater.

- Concurrent, multi-hold/deck vessel loading to minimize dwell time at marine terminals and disruption of commercial operations.

- Vessel "stowed to flow" through the SPOD to minimize dwell time associated with port Joint Reception, Staging, Onward Movement, and Integration (JRSOI) functions in the combat theater.

- Use of agile supply network analysis and the integration of sense and respond autonomic logistics to support dynamic sourcing and routing of high value/velocity items, including the diversion of cargo from surface to air at the Victorville JDDSP.

- Use of integrated electronic data interchange (EDI), extensible markup language (XML), and automated identification technology (AIT) to improve horizontal and vertical network visibility of end-to-end unit deployment and sustainment distribution.

- Use of universal data elements to integrate information flow (EDI, xml) and physical tracking of unit/pack, pallet, and container movement through the JDDSP to support the end-to-end distribution network.

- Use of knowledge enabled logistics and logistics based data and information fusion—the development or enhancement and fielding of advanced decision support tools (such as the Integrated Computerized Deployment System (ICODES), the Joint Forces Collaborative Toolkit (JFCT), and TRANSWAY) that operate on multiple cross-service platforms within a distributed networked environment to fuse asset visibility, operational situation awareness, and commander's intent. Knowledge enabled logistics will incorporate the use of intelligent agents to improve the knowledge based decision support of the commander's intent, and the operational and tactical agility and command and control of the deployment and distribution process.

- Extension of ICODES cross service single platform for vessel stowage to conduct pre-stow planning, single load planning, and dynamic re-planning capability assigning slots across multiple transportation modes concurrent with deployment adaptive planning to effect time compression in the deployment process and achieve better asset management with quality assured data fed through WPS/GATES and Global Combat Support System (GCSS) to operational and strategic echelons.

3.4 Illustrative Force Deployment Vision Scenario

In the future "To Be" scenario a deployment order is transmitted to multiple Power Generation and Support Platforms based upon the required unit of action capability packages for the mission. Pre-configured sustainment packages associated with the anticipated force consumption rates for the first thirty days of sustainment are readied for movement. An integrated business process is used for planning and executing the entire pre-deployment move from the multiple Power Projection Platforms to the APOE and SPOE. A potential scenario is depicted in Figure 4.

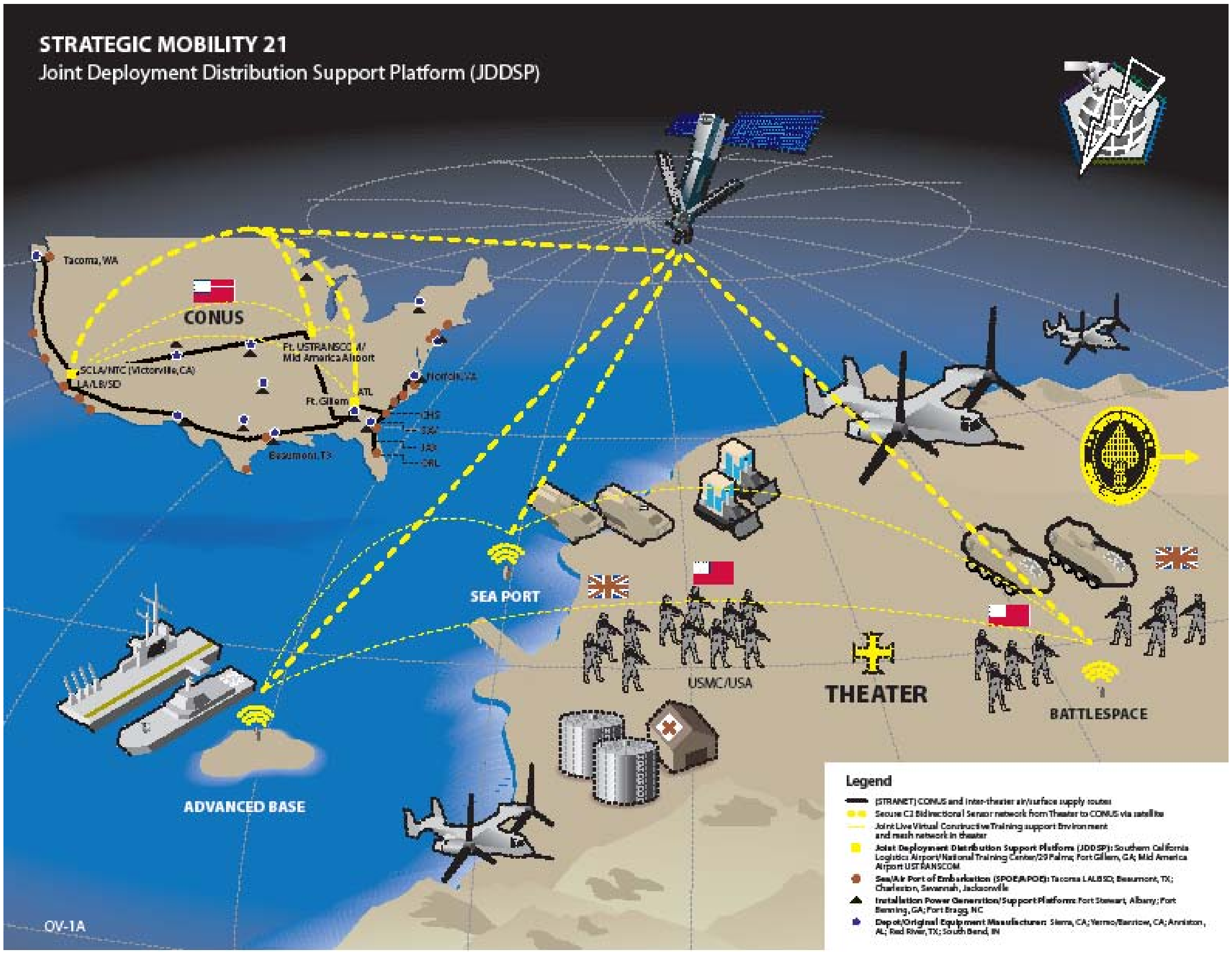

Figure 4: "To-Be" Integration of the JDDSP

Representatives of each major function in the planning process from unit, installation Power Generation/Support Platform, rail and truck load planner, cognizant Surface Deployment Distribution Command (SDDC) unit, Forces Command validation, regional planner, marine terminal planner, and vessel load planner, among others, function as part of a single collaborative ad hoc community of interest and adaptive planning decision support network. Each representative utilizes the same global portal and central database, which provides a common view and situation awareness and understanding of individual shipments and associated conveyances at the unit and rail consist level.

The ship pre-stow plan, developed at the Power Generation Platform based upon an enhanced version of the Integrated Computerized Deployment System (ICODES) relied upon and reviewed by the Surface Deployment and Distribution Command (SDDC), is based on the commander's intent, the correct discharge sequence at the SPOD, and the status of the supporting transportation network. Continuously updated ETA's and status reports following the information flow associated with the movement of units from all Power Generation and Support Platforms, provide the data for dynamically re-stowing the ship load plan based on the revised arrival schedule at a regional JDDSP.

Unit equipment and sustainment shipments are monitored en-route on an end-to-end basis through an integrated, internet based data communication network. Individual sustainment units include RFID tags. A central active tag in each container as part of a nested network of other sensors can be interrogated en route to validate updated arrival information for all sustainment items. Intelligent agents, each with a discrete domain, monitor the data emanating from each piece of unit equipment and container. Remote monitoring includes condition status, potential intrusion, acceleration, and vibration among other measurements to evaluate its operational status and readiness for continued deployment. Abnormal or out of tolerance reporting can be examined at the JDDSP before deployment through the strategic port.

As unit equipment arrives at the JDDSP, sufficient working and storage track is available to block stow each short haul rail unit train according to the dynamically re-stowed ship load plan. This infrastructure and supporting processes enables movement to the strategic port in the proper loading sequence. The rail block stow plans are set according to a dynamically reconfigured vessel stow plan which considers the available cargo at the JDDSP and the planned order of unloading at the combat theater SPOD. The arrival sequence will support maximum concurrent loading by the side port and stern ramps and up to two organic ship crane loading points in the case of the Large, Medium Speed, Roll-on/Roll-off (LMSR) ships.

Each short haul rail unit train arrives at the strategic port unloading ramp according to the assigned ship loading order thereby minimizing terminal dwell time, military equipment visibility, and vulnerability to intrusion or sabotage. This process minimizes the footprint required by the deploying force resulting in minimal interference with ongoing commercial operations at an already crowded commercial terminal. Units embarking on multiple vessels are coordinated among vessels and even multiple strategic ports served by the JDDSP. In the pre-planned, well-trained and thoroughly rehearsed (through simulation) loading operation, vessels are embarked and on their way to the theater of operations in less than half the historical loading time with an appropriate vessel stow factor for the type load and the operational requirements.

3.5 Outcomes, End States and Benefits

As described in the illustrative scenario above, the Strategic Mobility 21 Program is intended to effect the following outcomes, end states, and benefits:

- Significant contribution to rapid deployment process goals of reduced unit transit times - both inter and intra-theater[8]
- Improvements to end-to-end deployment and distribution process velocity, visibility, and C^2 decision support
- Enhanced operational agility in executing deployment packages linked to strategic scenarios
- Improved operational and tactical logistic situation awareness and collaborative visualization
- Permanent joint brigade level (scalable as necessary) pre-deployment logistics training capability and Joint Logistics Experimental Training Test-bed (JLETT) for advanced logistics concepts (e.g. RFID laboratory and sense and respond logistics experimentation)

4.0 STRATEGIC MOBILITY 21 FORCE DEPLOYMENT PROCESS ENABLERS

4.1 Overview

Strategic Mobility 21 will combine several end-to-end Force Deployment Process enablers. Some of the enablers described below are at the conceptual stage while others *represent* existing infrastructure, processes, or information systems. These include:

- Information technology architecture at the JDDSP that fully integrates with and supports the end-to-end joint force deployment and sustainment distribution process

- Joint Force projection and sustainment Automated Equipment Identification (such as Radio-frequency Identification or RFID) and other autonomous sensor experimentation

- Joint logistics deployment operations business process reengineering

- Sense and respond autonomic diagnostic and prognostic logistics and agile supply networks transformational capability

- Integrated, agile multi-modal infrastructure at the Victorville JDDSP and Fort Gillem BRAC site

- Agile supply network logistics buffer and vendor managed inventory fulfillment center (including direct Vendor Delivery) for commercial shipments and military sustainment shipments. The military buffer concept will focused on supporting the Joint Sea Base/trans-shipment ISB concepts

[8] The "1-4-2-1 strategy," as discussed in the March 2005 National Defense Strategy of the United States, is defined as: 1 - Defend the U.S. Homeland; 4 - Operate in and from four forward regions to assure allies and friends, dissuade competitors, and deter and counter aggression and coercion; 2 - Swiftly defeat adversaries in overlapping military campaigns while preserving for the President the option to call for a more decisive and enduring result in a single operation; and 1 - Conduct a limited number of lesser contingencies.

- Network-Centric AIT and EDI/xml IT Architecture for asset and shipment tracking inbound to, outbound from, and on the JDDSP, including integration with commercial air freight at Fort Gillem and Hartsfield-Jackson International Airport

The following paragraphs provide additional detail on several of the process enablers.

4.2 The Southern California Logistics Airport (Victorville, CA)

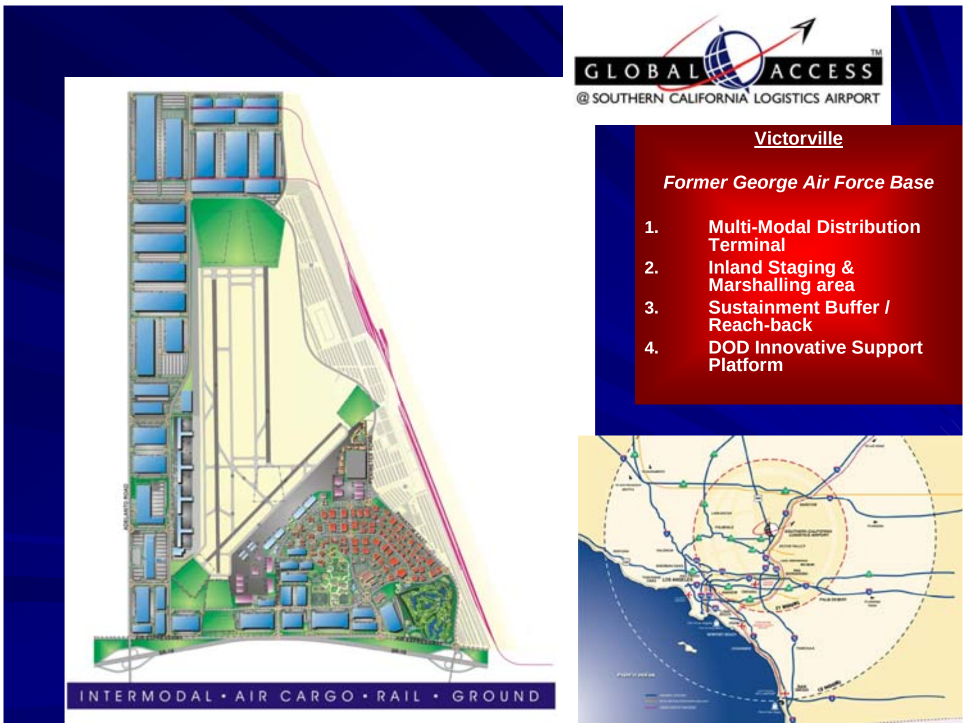

Figure 5: Victorville Southern California Logistics Airport JDDSP

The strategically located Victorville site comprises almost thirty thousand acres within the boundaries of the largest redevelopment agency in the State of California, affording almost infinite scalability with a sufficiently large buffer zone so as not to offend future residents. It is potentially served by two class one railroads, the Burlington Northern Santa Fe and the Union Pacific (UP), on a dual served stretch of transcontinental main line. The UP has full track rights to operate and serve customers en route along the Cajon main line from Riverside to Barstow - site of one of the two principal manifest hump yards on the west coast: Barstow for the BNSF and Colton for the UP. The transcontinental main line is part of the Strategic Rail Network (STRACNET) connecting Victorville to all other Power Projection Platforms across the nation.

The Victorville facility includes a 15,050 foot runway and a 12,000 foot runway, the former the longest in the western United States - capable of accommodating the largest commercial 747 or military C-5 aircraft fully loaded under all atmospheric conditions. The air facilities have an added advantage of being outside the air traffic control pattern congestion of LAX.

Victorville is located on the I-15 corridor near the intersection of the I-10 – part of the Strategic Highway Network (STRAHNET). The twin rail lines serve the Strategic Seaports of Long Beach, San Diego, and Oakland as well as the ports of Los Angeles and Port Hueneme. The facility also provides trans-load capabilities and warehouse management facilities.

4.3 Fort Gillem Base Realignment and Closure (BRAC) JDDSP

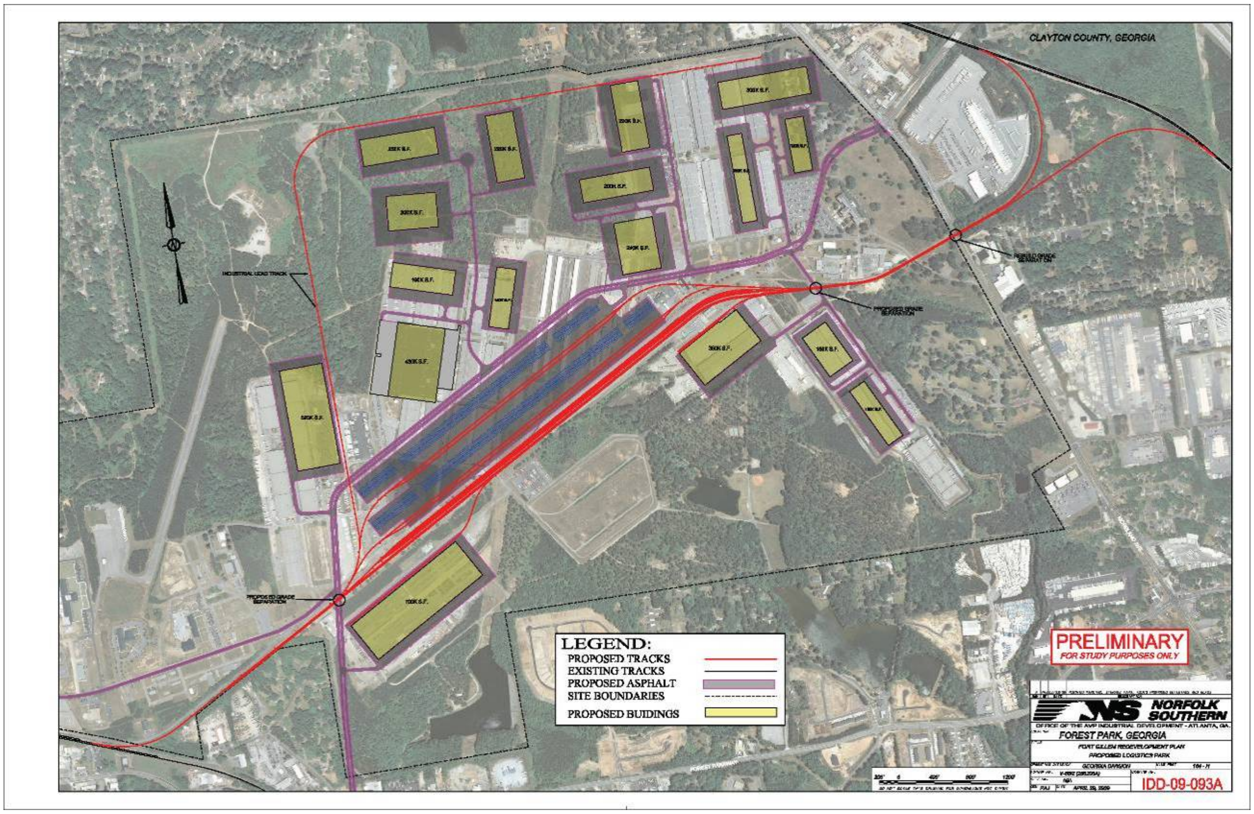

Figure 6: Fort Gillem Potential Prototype JDDSP

Since the inception of the SM 21 program it was intended to identify a second prospective Joint Deployment Distribution Support Platform (JDDSP) in the southeastern United States as the natural nexus for deployment and retrograde-reset reverse logistics Department of Defense activities with greater numbers of Power Generation and Support Platforms or DoD bases and facilities with rail capability.

Formal guidance, from the Surface Deployment and Distribution Command (SDDC) and Forces Command US Army, led directly to involvement with the Third Infantry Division headquartered at Fort Stewart and their preferred Seaport of Embarkation at the Port of Savannah. Modeling and simulation would provide initial proof of concept of agile port and JDDSP capabilities to be followed by a Milestone A live rapid deployment demonstration.

The capstone program demonstration was always intended to be a transcontinental rail movement of commercial capability featuring real time in transit visibility and dynamic re-planning capability for unit capability packages from multiple Power Generation Platforms.

The program became aware of the FY 11 planned closing of Fort Gillem, a World War II era logistics platform for Third Army deployment to the European Theater.

Fort Gillem's location near Atlanta, Georgia represents an ideal site for a potential second JDDSP intermodal facility for routing of rail freight by unit train from the port of Savannah through Macon to serve the Midwest and transcontinental traffic through Birmingham Alabama and Meridien MS to the west coast by high speed rail for military, commercial and passenger market segments.

The SM 21 program has since emerged as the presumptive fourth party logistics partner for that facility along with the Norfolk southern class one railroad and the City of Forest Park, the Local Reuse Authority for the US Army.

Fort Gillem represents in every aspect an ideal candidate for a southeast regional prototype for a Joint Deployment Distribution Support Platform (JDDSP). The dual use military and commercial combination inland freight hub and integrated logistics center envisioned as the signature for the SM 21 program. The potential interoperability with Hartsfield Jackson International airport in synchronizing high value air freight movement inbond under a common Foreign Trade Zone (FTZ) holds the promise of a world class logistics complex including global logistics education and training in collaboration with local authorities.

4.4 Sealift Mobility Network Architecture and Data Fusion

The Sealift Mobility 21 network architecture is based upon a four-tier integrated structure as outlined below and in Figure 7:

(1) The first tier represents the Data Capture Layer, which is responsible for feeding data from a heterogeneous array of external sources (e.g., sensors, GPS devices, RFID tags, etc.). The physical movement of freight assets and freight will be primarily tracked by automated equipment identification (AEI) (Bar code, OCR, RFID, container electronic seals (E-seals)). The AEI data will be transmitted with GPS location information by cellular (terrestrial), satellite, or a combination of cellular/satellite networks. The initial transmission of these signal-based data elements occurs largely in a wireless communications environment.

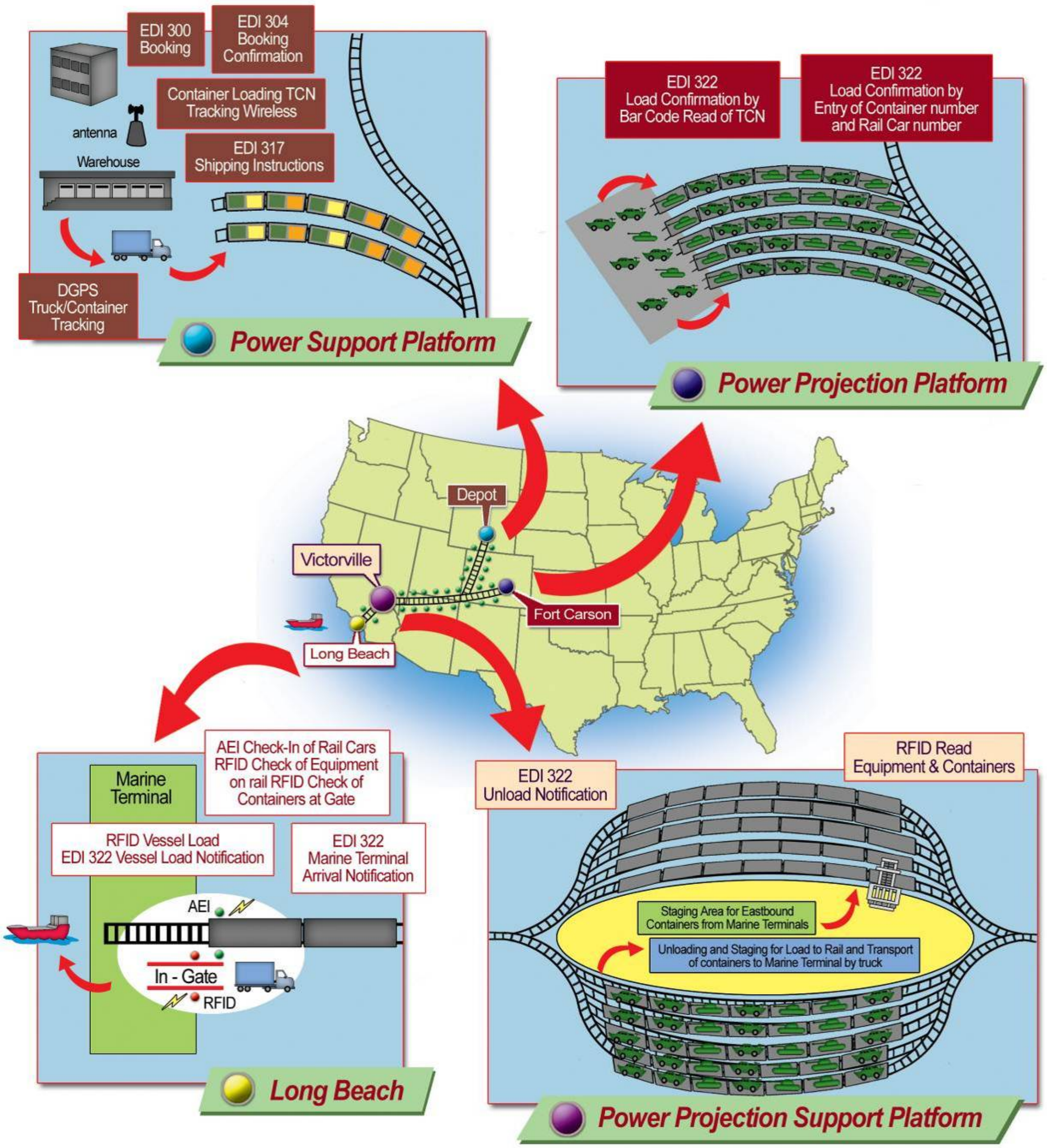

Figure 7: JDDSP Data and Process Integration Overview

(2) The second tier consists of an Integrated Data Layer. The principal enabler of this tier is a common database facility, which will be designed to scale from an initial single operational database (e.g., a Relational Database Management System such as Oracle) to a distributed database network that may eventually be based upon web 3.0 semantically enabled Rich Data Format System (RDFS) include Data Warehouses, Data Marts, as well as On Line Analytical Processing (OLAP) and Data Mining tools. The schema of the Integrated Data Layer will be based on a standard data set with defined formats, designed to minimize the mapping of data imported from external sources.

(3) The third tier is a Mediation Layer that is responsible for mapping the data received from external sources to the standard data set and formats supported by the common database facility in the Integrated Data Layer. The necessary data mapping capabilities will be provided by reusable net-centric enterprise services that are expected to progressively support more sophisticated data discovery functions.

(4) The fourth or knowledge tier is represented by intelligent collaborative software agents. The automated reasoning capabilities of these agents are made possible by an internal virtual representation of the logistic transportation domain, consisting of entities (i.e., objects) with behavioral characteristics (i.e., attributes) and contextual relationships (i.e., associations). This type of software representation, which is commonly referred to as “an ontology”, is typically coupled with subscription services to support rule-based agents that are driven by data changes in an opportunistic decision-support environment. In their role as adaptive tools, these agents are capable of accomplishing planning, re-planning, and related decision-assistance functions. In August, 2009 the SM 21 program, using open architecture web 3.0 tools and reference standards, developed the first Joint Logistics Ontology in collaboration with Stanford Research Institute and the US Joint Forces Command. The ontology is displayed on the World Wide Web in an unpopulated version.

Together the four tiers of this architecture will support seamless end-to-end distribution network visibility in a horizontal mode to support collaboration among network agents involved in the physical movement of freight and related information flow. The tiers provide vertical network visibility among decision-makers as well by ensuring interoperability with both DoD logistics legacy systems of record (e.g. ICODES, GTN, TCAIMS II) and the emerging cadre of information-centric applications (JFCT and TRANSWAY) that are the precursors of the rapidly evolving Global Information Grid (GIG).

4.5 Agile Port System and Network Operations

The strategic vision behind an agile port system, based upon systems of systems engineering applied to complex adaptive systems, is that a marine terminal has four basic functional elements corresponding to individual queues within the facility functioning as a system server: (1) vessel berth queue; (2) intermodal rail yard queue; (3) container yard queue (including perhaps a container freight station for consolidation of less than container load (LCL) freight; and (4) a gate queue to accommodate container pickup and delivery by local truck dray operation. In fact, the Southern California region logistics network may be defined as a series of servers and queues, each with their own dispatch rules, dwell or wait times. The network is connected by road and rail distribution lanes, referred to as arcs, and measured in transit times between the various servers. Within the region there are fifteen marine terminals (eight of which have on dock rail service), six intermodal rail ramps or terminals, and 360 million square feet of warehouse and distribution facilities over 500,000 square feet in footprint.

Three of those functional elements do not have to be physically located at a congested marine terminal facility. They can be relocated inland to a multi-modal freight facility/Integrated Logistics Center or JDDSP serving multiple terminals. Access to air transport facilities, as well

as surface transportation road and rail networks, is important because in both commercial and military operations a supply chain disruption is frequently mitigated by resorting to more expensive air transportation in a time definite delivery logistics environment. An inland multi-modal freight hub is at its core a multi-faceted logistics buffer serving first a marine terminal and secondly conventional railroad operated intermodal rail ramps, which combine blocks of double stack rail cars or chain tie down cars from multiple origins (or Power Projection Platforms) to form unit trains bound for a single destination.

An agile port system (APS) then is comprised of: (1) an efficient marine terminal which maximizes the use of on dock rail; (2) virtually integrated or dedicated regional road/rail network capacity; (3) synchronized operations with an inland multi-modal freight hub or JDDSP as a load center for rail block swapping, container sorting by destination and distribution lane, consolidation and deconsolidation, cross-dock and trans-loading, and transportation equipment (chassis, empty container, rail car, and trailer) interchange, storage, maintenance; and (4) an overarching regional information technology architecture to synchronize vessel arrival and departure, marine terminal, short haul rail network, and load center (JDDSP) operations. The information technology architecture monitors freight flows by associating individual shipments and conveyances for in transit visibility and velocity management purposes.

An important APS attribute is the ability to accommodate both military container and unit equipment manifest train movement and commercial intermodal container movement across the regional network and on marine terminals without mutual interference. In its military application, the primary value of the APS is improved joint force surge deployment and sustainment distribution. The APS is designed to exploit emerging advanced logistics concepts and capabilities with anticipated performance and effectiveness benefits. These benefits are measured in increased throughput velocity; static and dynamic in-transit visibility; economy in transportation and logistics cost-effectiveness; efficiency in distribution network capacity utilization; reliability and flexibility in dynamic sourcing, routing, and healing; and enhanced intermodal transportation security and force protection from factory, depot or installation through the strategic port.

5.0 STRATEGIC MOBILITY 21: CAPABILITIES AND ATTRIBUTES

National strategy calls for the ability to prosecute one major combat operation (MCO) and several concurrent operations associated with the global war on terrorism (GWOT). This places a premium on focused logistics capabilities to enable rapid deployment and distribution. To support the full-spectrum dominance in adaptive distributive operations, the Strategic Mobility 21 program will develop, demonstrate and deploy several major logistics concepts. These concepts each require specific capabilities and attributes that are associated with sustainment distribution or force deployments from power projection platforms through the JDDSP to the strategic port of embarkation.

During the Strategic Mobility 21 prototype JDDSP development, experimentation, and demonstration process, it will be important to compare alternative approaches that contribute to the end-to-end distribution network. Therefore the required attributes associated with the capabilities and concepts to be incorporated in the prototype JDDSP are identified within this

section. These attributes are necessary to test and measure the effectiveness of the concepts and capabilities.

5.1 Strategic Mobility 21 Required Joint Military Capabilities

Listed below are the required capabilities for the prototype JDDSP:

5.1.1 Logistics Information Fusion

Capabilities and characteristics essential for meeting the logistics information fusion challenge include the following:

JDDSP integration with the DoD end-to-end information grid:

- Assured communications and information security at the JDDSP to DoD Defense Information Systems Agency (DISA) standards
- Net-centric enterprise services, such as:
    - Universal transaction services
    - Distributed environment support
    - High assurance of services
- Redundant, agile, and survivable infrastructure, combined with joint interdependencies, which enables infrastructure that can withstand both kinetic and directed information warfare attacks.

Near real-time support (focused on the segment from the source through the JDDSP to the US strategic port) to enable the end-to-end[9] control of the entire deployment, distribution, and sustainment pipeline—from mobilization, deployment, employment, reconstitution, regeneration, retrograde, reset, redeployment, and demobilization—across the entire logistics spectrum, with the characteristics outlined below:

- Ability to capture timely, accurate, interoperable source data (enabled by data standards)
- High-quality, authoritative data available for processing and presentation applications
- Enhanced asset visibility, control, and management decision support tools that turn available data into “actionable” information
- Information-rich visualization so deployment and distribution stakeholders can quickly and efficiently assimilate the volumes of data and information pertaining to their respective areas of responsibility
- Robust network architecture capable of providing all who need it rapid access to an integrated operational picture with timely, accurate, and synchronized operational, intelligence, and logistics information

[4] End-to-end is from the source of supply/services to the tactical level/point of consumption/point of effect, across Services and Defense agencies.

- Automatic adaptive planning and dynamic re-planning capability to reduce significantly the time necessary for developing and evaluating alternative approaches for logistics support
- Execution monitoring—through trigger processes or plan sentinels at key nodes or links in the pipeline support by intelligent agents—for identifying and reacting rapidly to deviations from the movement plan and ship loading plan while unit equipment is en-route from multiple Power Project Platforms

5.1.2 Joint Deployment and Rapid Distribution

Capabilities essential for supporting the joint deployment/rapid distribution challenge include the following:

- A fully enabled JDDSP distribution support system, supported by a robust infrastructure, and further characterized by capabilities for:

    - optimizing rapid projection, delivery, and handoff of joint forces and sustainment assets
    - rapidly initiating force deployment processes and moving required forces and sustainment to the place and at the time required
    - supporting returning forces to home station or other location for regeneration and reconstitution

- Integrated, effective, and efficient deployment and distribution processes that fully support DoD joint force deployments and sustainment through the JDDSP:

    - enabled by integrated military and commercial business practices and interoperable systems
    - integrated and synchronized vertically and horizontally from the strategic to the tactical level
    - capable of determining distribution capacity and optimizing distribution capacity allocation, transportation allocation, carrier selection (including sources of opportune lift), scheduling, and rescheduling based on supporting the evolving commander's intent.

5.1.3 Agile Sustainment

Capabilities and characteristics essential for meeting the agile sustainment challenge and that are applicable to the prototype JDDSP include the following:

- Use of common metrics, standards, and processes that promote simplicity and interoperability with all Services and commercial entities
- Collaboration with the civilian sector to take advantage of advanced business practices, commercial economies, and global nonmilitary networks
- Integrated and synchronized contractor logistics support

- Remote monitoring, diagnostic, and prognostic devices and knowledge based-information systems to sense, predict, report, and anticipate problems in the distribution system

Much of this strategy will be contained in the Strategic Mobility 21 program joint experimentation campaign plan which consists of:

- Continuous co-evolution of logistics capabilities, employing:
  - Proof-of-concept and learning prototypes that are used for experimentation and assessment, and that may lead to implementation end items;
  - Rapid evolutionary development of doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) solution capabilities (in physical, cognitive, and information domains using early developments, e.g. alphas, betas, and pre-production items)
  - Surrogates, including modeling and simulation, of the logistics capabilities and of other military enterprise capabilities and infrastructure;
  - Early integration of prototypes and rapid development products with other military enterprise capabilities and infrastructure;

- Aggressive scheduling and execution of learning-oriented hypothesis-driven experiments, including tabletops, simulations, limited technical assessments, interactive experiments with war-fighters, exercises, war-games, Joint Capability Technology Demonstrations (JCTDs), and controlled deployment of early development capabilities in relevant operational environments.

- These experiments have, as their objectives:
  - socialization, capabilities exposure
  - discovery, knowledge-development and sharing
  - two-way learning
  - military utility assessment
  - development evolution and refinement
  - review, validation
  - introduction, training
  - accelerated DOTMLPF development and integration;
  - support for budget process, congressional oversight, strategic direction and guidance

A central element of the Strategic Mobility 21 program experimentation campaign is the encouragement and fostering of public/private partnership collaboration and cooperation, including evaluation and integration into the experimentation campaign (and subsequently into transformed logistics capabilities) of knowledge, technology, science, research, and products from the public/private sector. This also includes sharing of development costs and risks; and testing and evaluation of the integration with commercial, academic, and other government/non-government/private capabilities and infrastructure. This process allows for the rapid creation of knowledge and insights, and is opportunistic and constantly seeks ideas and enabling technologies from a proactive, networked interaction within and between government, industry, and academia.

5.2 Strategic Mobility 21 Required Military Logistics Attributes

In order to compare alternative solutions and to measure achievement of goals and objectives in terms of performance and effectiveness, concepts and capabilities must have characteristics—attributes—that can be tested or measured. The following emerging attributes or requirements for the collaborative regional supply network architecture will be used during the Strategic Mobility 21 program:

- **Fully Integrated**: Fully integrated elements with all functions and capabilities focused toward a unified purpose
- **Networked**: Linked and synchronized in time and purpose, capable of capitalizing on information and near simultaneous dissemination to turn information into actions through a common operating picture
- **Decentralized**: Operate with shared knowledge of supporting transportation network environment, as well as a clear understanding of strategic force deployment objectives and commander's intent
- **Adaptable**: Versatile, agile, capable of being tailored, scalable, able to adapt fundamental capabilities in a multi-use manner; and prepared to quickly respond to any contingency with the appropriate distribution solution
- **Decision Superiority**: Arrive at and implement better-informed decisions at a tempo that allows logistic support personnel to shape the situation or react to changes and accomplish the force deployment and distribution management mission

The following additional logistics attributes associated with JDDSP support will also be considered:

- **Effective**: Meet war-fighter or customer-driven logistics support requirements under specified conditions to specified standards
- **Reliability**: Consistently meeting war-fighter or customer-driven logistics support requirements to specified standards
- **Affordability/cost-effectiveness**: Providing the war-fighter with effective and reliable support capability within specified level of resources.

5.3 Strategic Mobility 21 Required Commercial Logistics Attributes

In addition to the above, on the commercial logistics side the specific attributes applicable to an agile supply demand network performance would include:

- **Velocity:** Throughput velocity incorporating both a spatial and temporal element reflected in both transit and dwell times of shipments and conveyances moving through the network
- **Visibility:** In transit visibility of shipments and conveyances moving through the network
- **Sustainability:** Sustainability in light of anticipated future growth
- **Mobility:** Flow and accessibility reflected in the absence of bottlenecks

- **Reliability:** As measured in capacity for recovery from network disruption
- **Efficiency:** As measured in terms of capacity utilization
- **Security or force protection**

5.4 Control of the Deployment and Distribution Pipeline – A Primary JDDSP Capability

Paramount among these focused logistics capabilities for the regional prototype JDDSP is the ability to regain control of the deployment and distribution pipeline. Each element in the end-to-end deployment and distribution pipeline must be able to collaborate to maintain, and when required, regain control of the pipeline. To ensure the ability to rapidly project overwhelming combat power and the materiel and support services necessary to sustain the force once deployed, the JDDSP must support its responsibility to maintain end-to-end control of the entire deployment, distribution, and sustainment pipeline. This control is extended across the entire operational spectrum from mobilization, deployment, employment, redeployment, and demobilization. The JDDSP operators, along with logisticians and planners at all organizational echelons, must be linked to ensure that they can coordinate their activities across organizational boundaries, with power projection support platforms, and with all distribution entities supporting a deployment. Each individual must readily know and understand the impact of their plans, actions, and decisions across the entire operational environment. The key capability required to gain control of the pipeline is automatic planning and re-planning or dynamic re-planning.

The critical element of this tightly linked and coordinated process will be the ability to plan in sufficient detail to allow execution directly from the plan – such as the ship stow plan for unit equipment deploying from a power projection platform. The movement plan can then be developed in consonance with explicit common assumptions and expectations. Deviations from the plan can be detected through the creation of trigger processes or plan sentinels placed at key nodes or links in the transportation network. These plan sentinels provide the necessary closed-loop feedback to maintain control and support the oversight and control process. Interoperable processing, the sharing of high-quality data, and an assured, robust communications capability are essential.

5.5 Total Asset Visibility – A Primary JDDSP Capability

Real-time asset visibility is critical to the DoD’s ability to provide timely, effective, and efficient support to deploying and deployed forces. The cornerstone to realizing this capability is quality data obtained through the use of automatic data capture devices. These include automatic identification/radio frequency, prognostics and diagnostics devices, and others. These devices and the supporting technologies—coupled with the capability to retrieve information from disparate and widely dispersed systems and databases—are critical to realizing the degree of total personnel and asset visibility required to know the location, status, and condition of personnel, equipment, and forces. In the area of engineering, the capability to quickly determine and execute engineer and facility requirements for deploying forces is required to provide adequate engineer response to complex contingency operations. The capability to remotely monitor the operating status of the transportation system will enable logistics managers to anticipate disruptions in the distribution network.

6.0 JOINT OPERATIONAL CONCEPT EXPERIMENTATION AND DEMONSTRATION PLAN

6.1 Overview

The heart of the Strategic Mobility 21 – built upon a Joint Capability Technology Demonstration institutional model-- is the Joint Experimentation Campaign Plan and Joint Capability Transition Plan. The basic process to be used for this program is:

- Validate wherever possible current and future end state requirements
- Simulate the physical environment or process and explore alternatives
- Verification and validation of the simulation results
- Selection of existing enabling software and hardware systems
- Determination of capability gaps
- Software emulation of the objective system
- Experimentation to close capability gaps
- Demonstration of new and integrated capabilities
- Deployment of the objective system or capability

Some of the potential discrete elements of the proposed Demonstration and Experimentation plan to be scheduled over the four-year period include:

- Military strategic sealift ship instrumented with an integrated system of sensors and cameras to assist in the re-planning and loading operations. The objective is to increase loading velocity and stow factors and contribute to the improvement of end-to-end in-transit visibility.
- Cargo trans-loading and diversion to airlift to support changing cargo priorities and cargo associations with in-theater Supply Support Activities (SSA). The objective is to provide a more responsive system to support the US TRANSCOM JDDOC (Joint Deployment Distribution Operations Center). The goal would be to reduce the amount of effort the JDDOC must focus on time critical strategic planning and re-planning activities concerned with changing cargo priorities and airlift operations.
- Agile/adaptive supply networks and sense and respond logistics experimentation to develop the capability and application to enable the JDDSP to support the joint force deployment and distribution processes.
- Application of inland, multi-modal, freight hub at Victorville acting as the prototype JDDSP supporting Army Power Generation Platforms and Marine Corps Bases for rapid force deployment from the United States to the theater.
- Application of high-speed short-haul rail link from Victorville-and from Fort Gillem in the southeast region -- to strategic ports of embarkation with pre-stow load planning, marshaling, and staging at the inland JDDSP to synchronize vessel loading at the US Strategic Port/SPOE.
- Application of integrated, commercial-military logistics network-centric information technology with ontology-based intelligent agents (ICODES, JFCT, TRANSWAY).

- Application of adaptive distributed logistics network performance capabilities including dynamic network routing, sourcing, self-diagnostics and healing using multiple distribution channels achieving near real-time horizontal and vertical network visibility through association of shipment with conveyance, and monitoring and integration of both physical movement of freight using AEI/AIT and associated information network flow using EDI/XML/PML to improve velocity, flexibility, visibility, reliability, security and C4I in deployment and distribution process.
- Demonstration, experimentation, and integration of the “control tower” system including: selected advanced yard management systems, warehouse management systems (WMS), transportation management systems (TMS), intermodal management systems and vendor managed inventory (VMI) applications.

6.2 Strategic Mobility 21 – Joint Experimentation and Demonstration Campaign Phases

The Strategic Mobility 21 Advanced Logistics Technology Demonstration program is a four year program. Each year of the program is considered a phase as outlined below:

Phase 1: September 2005 through September 2007
Phase 2: October 2007 through March-September, 2010
Phase 3: October 2010 through September, 2012
Phase 4. October 2011 through September 2114 Follow on JDDSP APS Joint Capabilities Technology Demonstration (JCTD)

The program Phase descriptions are outlined below:

Phase 1: In the first Phase the program set the course for the duration of the program by adopting the DoD Joint Capability Technology Demonstration (JCTD) model for program structure and the Joint Capability Integrated Development System (JCIDS) for military use evaluation and spiral development of concepts to demonstrated capabilities.

The first two years of the four-year timeframe focused on the simulation, emulation, and initial experimentation to identify the requirements and gaps associated with a prototype JDDSP at Victorville. Three software system components were developed during Phase 1: Southeast Agile Supply Network (SCASN), the related Multi-Modal Terminal Model (MMTM), and the first iteration of the Inland Port Terminal Operating System.

SCASN is the first and only time domain reference model built on Arena that includes all major nodes (marine terminals, intermodal rail facilities, warehouse and distribution facilities, and the Victorville JDDSP) and major arcs (strategic highway and rail corridors). The model supports analysis of the regional distribution lanes at a mesoscale (medium), level of fidelity.

SCASN allows “what if” feasibility and impact scenarios to be evaluated including potential changes in legislative policy and regulatory requirements, public and private infrastructure investment, business rules changes, or commercial best practices adoption. A companion model built upon the same platform and database along with a proprietary algorithm enables network optimization and tradeoff analyses among independent variables such a total transportation cost,

regional air quality and congestion mitigation, reliability and sustainability, efficiency infrastructure utilization, throughput velocity, and energy and carbon footprint reduction. SCASN and the companion model were validated with Riverside County supplied rail data for the two class one railroads to evaluate the range and distribution of public private benefits at Colton Crossing, a top priority of the California Transportation Commission.

A related Multi-modal terminal (MMT) model was developed to optimize major functions of shipment track and trace, equipment maintenance, and truck and rail operations across surface and air modes at a JDDSP but has not been validated to date.

A unique Inland Port Multi-modal terminal operating system (IP-MTOPS) built upon the CSX intermodal rail operating system was developed pending validation at a JDDSP prototype with current multi-modal capability.

Phase I concluded with the development of the basic framework information architecture for the JDDSP, which supports the “deliver” function of the supply chain logistics networks.

Phase 2: The second phase of the program saw the completion of the Joint Experimentation Campaign Plan, JCIDS Initial Capabilities Document including DOTMLPF evaluation of the JDDSP concept, Joint Capabilities Transition Plan, and successful deployment of the Initial operating capability (IOC) of the JDDSP service oriented architecture based upon composition of web services in a commercial operating global distribution network environment.

It began with a data collection effort directed by USTRANSCOM J 4/5 involving Fort Stewart and the 3d Infantry Division and the Port of Savannah. A precursor of the Southeast Agile Supply Network (SEASN) model was developed and validated, demonstrating the anticipated benefits from deployment of the JDDSP business process and information technology architecture to joint force deployment. The modeling and simulation was intended to support Milestone A JCIDS military utility demonstration, but the required coordination level of effort proved insurmountable in a wartime rapid deployment cycle environment.

The program adopted a bottom-up experimentation with Dole Foods, a Fortune 100 company, to test the hypothesis and if successful productize an operational capability integrate vendors with complementary track and trace capabilities across multiple carriers and modes, and members of Dole’s global supply network. The effort will result in a validated web service capability deployed in a commercial environment before the end of Phase 2.

A second prototype JDDSP facility was identified at Fort Gillem, a pending 2011 Base Realignment and Closing (BRAC) former US Army facility near Atlanta, Georgia. The SM 21 program brought Norfolk Southern, a class one railroad to invest in an intermodal facility at the Fort Gillem site with excellent conductivity with Atlanta Hartsfield International Airport and the strategic seaports of Savannah-Brunswick. A SEASN simulation model was developed with major southeast regional transportation and distribution nodes and arcs focused upon the port of Savannah and expandable to include the strategic seaports of Charleston and Jacksonville served by the CSX railroad.

The Joint Logistics Education Training Transformation Test-bed (JLETT) was launched and produced a Joint Logistics Education and Training Road Map with US Joint Forces Command (JFCOM) and US Transportation Command (USTRANSCOM). It also produced a Sense and Respond Logistics Road Map for the Assistant Under Secretary of Defense for Acquisition Technology and Logistics.

A series of pilot education and training experiments was; in partnership with San Bernardino County, beginning with Newell Rubbermaid, a Fortune 100 company; to provide entry level training for all skills sets required for a typical 1 million square foot warehouse complex. This was followed by a collaborative training effort with the USMC at the Yermo Marine Corps Logistics West Base in Barstow CA incorporating all the truck and rail dispatch, operations, planning and maintenance applicable to the US Army National Training Center Fort Irwin and Victorville.

Phase 3: The Phase 3 program will focus upon proof of concept demonstration under the JCIDS Capability Development Document (CDD) under USTRANSCOM and USJFCOM supervision The IP-MTOPS operating system will be validated through integration of Fort Gillem with Atlanta Hartsfield International Airport at DoD's only Crime Scene Investigation (CSI) forensic laboratory. The culminating event to demonstrate a prototype National JDDSP network would involve multiple power projection platforms and two regional JDDSP and one or more Sea Ports of Embarkation on the East and West Coasts.

As a precursor, a cold chain unit train combined demonstration and leave behind capability will be planned and executed, linking the two prototype JDDSP facilities once intermodal rail capability is completed at Fort Gillem. More joint experimentation will be conducted with the 3rd Infantry Division at Fort Stewart and the Port of Savannah and the USMC with the Port of Jacksonville. The Port of Jacksonville and related intermodal rail and air facilities will be integrated into the SEASN model to be validated by USJFCOM as part of the Joint Force Projection Toolkit.

Phase 3 will conclude with the SM 21 program emerging as a forth party logistics provider and the initial deployment of web services and physical third party logistics capabilities at both facilities.

Phase 4: The related optional Phase 4 effort will collaborate with the Center for Commercial Deployment of Transportation Technology (CCDoTT) program in a follow-on formal Joint Capabilities Technology Demonstration (JCTD) to be submitted through the Office of Naval Research, USJFOCM, and USTRANSCOM/SDDC in Fiscal Year 2011 building upon the 2010 Quadrennial Defense Review and Program Operating Memorandum (POM) 12-13.

Phases 1 and 2 are defined in more detail below.

6.2.1 Phase One Program Structural Overview

Business Process Structured Analysis: As one of the early Phase One activities, a structured analysis of the joint force deployment and sustainment processes (systems) was completed.

Step 1: The primary purpose of Step 1 was to transform user policy and processes and the Strategic Mobility 21 Operational Concept into an integrated process. Evaluation of the individual systems associated with commercial and military force deployment and cargo movement operations was completed.

Step 2: Business process re-engineering was completed to integrate stovepipe business processes. The goal was to enable the development of a common operating picture, or a systems of systems, that will allow the JDDSP to achieve its objectives.

Simulation: Simulation model was the first six months of the project. Experimentation ran concurrently with the simulation process.

Step 1: Conducted Independent research to create a regional dynamic simulation model that showed the operation of the ports in relation to existing marine terminal on dock rail facilities and the Southern California Logistics Airport's (SCLA) rail facility. Described the network and where Victorville, as the prototype JDDSP, would actually operate within the objective network. It was an independent evaluation of how much capacity there is in the system for short haul rail and in particular the Cajon Pass.

Step 2: Created a simulation of a potential operating system for the SCLA's rail facility. Such as identifying the performance specifications, what the different phases or stages should look like, how many linear feet of lead track, working track, etc. The system simulation of the potential operating system focused on the military force deployment point of view.

Experimentation:

Step One: Surveyed the existing sensors on all of the mainline rail tracks and highways to see what sensors are currently in place. The rail sensors would enable the project to synchronize short haul rail coming out of Victorville or long haul rail bypassing Victorville and going towards the ports. This process helped decide which sensors to use before adding new sensors to the Victorville rail track. The second step involved surveying highways sensors called (CVISIN). These sensors verify the tag number of each truck and provide some information as to who the truck belongs to, where it's going and coming from and the load weight. This process helped to identify what the grid or network currently looks like in terms of sensory devices.

Step Two: After the sensor network is identified, a significant percentage of the freight moving between the ports and Victorville can be tracked to see how much freight Victorville can capture. This process showed where the bottlenecks are in the network and the best routing. Particularly, by examining road and rail, it can be determined how much of the freight can be shifted from road to rail.

Emulation:

After identifying a grid network, additional sensors can be added to the network. Adding additional sensors to the highways or rail tracks in selected locations allows for adjustments to be

made to the network to get real time physical data. This process moved into the emulation stage, which made the simulation real because it operated on real time physical data.

The emulation stage demonstrated real time movement patterns for containers. It showed cargo movement from terminals to warehouse and distribution centers and what types of cargo were being moved and the frequency. Once all of the real time data was compiled, the goal was to contact individual shippers and create agreements to experiment and/or demonstrate with them the shipment of some of their containers via short haul rail to Victorville for demonstration purposes. This process helped identify how many hours it takes to ship containers from the ports to Victorville, what type of service levels Victorville can provide, how many rail cars are needed to move between point A and B, how many trips can be made in a day, and what kind of frequency of service is necessary.

On an experimentation level, instruments/tags were placed in the individual shipper's containers and the containers were tracked around the region to show better routing and where shippers might want to perform trans-loading.

Web Portal Development

Step One: Reviewed and revised as necessary the data dictionary of all data elements required by JDDSP operations. Included in the data dictionary were the common data elements of name, description, format, allowable values, and range of values or enumerations.

Step Two: Developed the initial system specification that included at least the following software components for the proposed APS test-bed and began Web Portal development:

- Web based Enterprise Project Management Office
- AIT, PDA and GPS data capture software interfaces
- Network communications software
- Common user interface (e.g., browser) that would provide system condition alerts with multiple supporting Dashboards (with the ability to support user queries, monitoring of tracks, agent warnings and alerts, report generation, re-planning, data import, system initialization)
- Interfaces for all individual COTS/GOTS systems
- A database management system (i.e., the Strategic Mobility 21 Database) with necessary interface software
- System monitoring tools for system diagnosis and maintenance tasks
- Performance assessment software suite of integrated tools, which will continuously evaluate the performance of the deployment and distribution (military) and transportation management (commercial) operations.

6.2.2 Phase Two Overview

Demonstration:

This stage takes place when individual shipments progress from experimentation to demonstration. Once the lead track and storage track at the SCLA rail facility is complete and the network and operating system for the rail facility is in place, containers would actually start being physically moved via short haul rail on some kind of an abbreviated schedule back and forth from Victorville to the ports.

The simulation model and the operating system for Victorville would then be linked with the operating system of one or more of the marine terminals. The project is currently scheduling, for demonstration purposes, the real live short haul rails by synchronizing the operating systems.

7.0 JOINT CAPABILITY TRANSITION PLAN AND LEAVE BEHIND INITIAL OPERATIONAL CAPABILITY

7.1 Victorville as Joint Deployment Distribution Support Platform (JDDSP)

The primary leave behind will be the prototype JDDSP described in this document.

7.2 Fort Gillem Base Realignment and Closure as Joint Deployment Distribution Support Platform (JDDSP)

The primary leave behind will be the prototype JDDSP described in this document.

7.3 Joint Logistics Education Training Transformation Test-bed (JLETT)

The second leave behind is an integrated Joint Logistics Education Training Transformation Test-bed (JLETT) providing an end-to-end Deployment and Distribution process experimentation and distributed logistics network laboratory capability. The JLETT will support pre-deployment simulation and live training at the strategic, operational, and tactical level and other Focused Logistics concepts, such as Sense and Respond Logistics experimentation. This includes joint military and commercial experimentation with technologies such as Radio Frequency Identification (RFID). The JDDSP will be the basis for the JLETT and will provide an ongoing national commercial and military logistics training and experimentation center. The JLETT will be developed during the four phases of Strategic Mobility 21. In the military context, the JLETT will reach beyond the essentials of training event planning and execution by ensuring that all elements of joint force deployment and sustainment distribution command and control, including systems, processes, and techniques, are employed in the system for Service and joint training. In summary, the JLETT will provide the resources, coordination, focus, and a test-bed for the development and implementation of commercial and military advanced training technologies.

ACRONYMS

4PL	Fourth Party Logistics
AEI	Automatic Equipment Identification
AIT	Automated Identification Technology
AOR	Area of Responsibility
APOE	Aerial Point of Embarkation
APS	Agile Port System
BNSF	Burlington Northern Santa Fe Corporation (railroad)
BRAC	Base Realignment and Closure
C2	Command and Control
CCDoTT	Center for the Commercial Deployment of Transportation Technology
CCP	Container Consolidation Points
CDD	Capability Development Document
CENTCOM	US Central Command
CONUS	Continental United States
COTS	Commercial Off-The-Shelf
CSI	Crime Scene Investigation
CSX	Chessie Seaboard Multiplier
DGPS	Digital Global Positioning System
DISA	Defense Information Systems Agency
DLA	Defense Logistics Agency
DoD	Department of Defense
DOTMLPF	Doctrine, Organization, Training, Materials, Leadership, Personnel, & Facilities
EDI	Electronic Data Interchange/Interface
EMT	Efficient Marine Terminal
ETA	Estimated Time of Arrival
EUCOM	European Command
FTZ	Foreign-Trade Zone
GATES	Global Air Transportation Executive System
GCSS	Global Command Support System
GIG	Global Information Grid
GOTS	Government Off-The-Shelf
GPS	Global Positioning System
GTN	Global Transportation Network
GWOT	Global War on Terrorism
GWOT	Global War on Terrorism
ICODES	Integrated Computerized Deployment System
ILC	Integrated Logistics Center
IOC	Initial Operating Capability
IP-MTOPS	Inland Port – Multi Modal Terminal Operating Systems
ISB	Intermediate Staging Base
IT	Information Technology
JCIDS	Joint Capabilities Integrated and Development System
JCTD	Joint Capability Technology Demonstration

JDDE	Joint Deployment Distribution Enterprise
JDDOC	Joint Deployment and Distribution Operations Center
JDDSP	Joint Deployment and Distribution Support Platform
JFCOM	Joint Forces Command
JFCT	Joint Forces Collaborative Toolkit
JFP&S	Joint Force Projection and Sustainment
JLETT	Joint Logistics Experimental Training Testbed
JNTC	Joint National Training Capability
JOC	Joint Operational Concept
JRSOI	Joint Reception, Staging, Onward Movement, and Integration
LAX	Los Angeles International Airport
LCL	Less than Container Load
LMSR	Large, Medium-Speed, Roll-On/Roll-Off Ship
LOGCROP	Logistics Common Relevant Operational Picture
MARAD	Maritime Administration
MCO	Major Contingency Operation
MCO	Major Combat Operations
MMTM	Multi-Modal Terminal Model
MPO	Military Post Office
NECC	Navy Expeditionary Combat Command
NOC	Network Operations Center
NOLSC	Naval Operational Logistics Support Center
NORTHCOM	United States Northern Command (Homeland Security)
OCR	Optical Character Reader
OIF	Operation Iraqi Freedom
OIF	Operation Iraqi Freedom
OLAP	On-Line Analytical Process
PACOM	Pacific Command
PDA	Personal Data Assistant
PML	Physical Markup Language
POLA	Port of Los Angeles
POLB	Port of Long Beach
POM	Program Operating Memorandum
POSD	Port of San Diego
PPO	Port Planning Orders
PPP	Power Projection Platforms
PPP	Power Projection Platforms
RDFS	Rich Data Format System
RFID	Radio Frequency Identification
SCASN	Southern California Agile Supply Network
SCLA	Southern California Logistics Airport
SDDC	Surface Deployment and Distribution Command
SEASN	South East Agile Supply Network
SM21	Strategic Mobility 21
SOCOM	Special Operations Command
SOUTHCOM	Southern Command

SPOD	Seaport of Debarkation
SPOE	Seaport of Embarkation
SSA	Stevedoring Services of America
STRACNET	Strategic Rail Corridor Network
STRAHNET	Strategic Highway Corridor Network
STRATCOM	US Strategic Command
TCAIMS	Transportation Coordinator's Automated Information for Movements System
TCN	Transport Control Number
TEU	Twenty Foot Equivalent Unit (Cargo)
TMS	Transportation Management System
TRANSCOM	Transportation Command
UP	Union Pacific Corporation (US Railroad)
USA	United States Army
USDOT	US Department of Transportation
USJFCOM	United States Joint Force Command
USMC	US Marine Corps
USTRANSCOM	US Transportation Command
VMI	Vendor Managed Inventory
WMS	Warehouse Management System
WPS	Worldwide Port System
XML	Extensible Markup Language

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